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VOLUME 39, NO. 9

AMERICAN DYESTUFF REPORTER

DEVOTED TO TEXTILE CHEMISTRY • BLEACHING • DYEING • PRINTING • FINISHING

American Textile Machinery Exhibition Number

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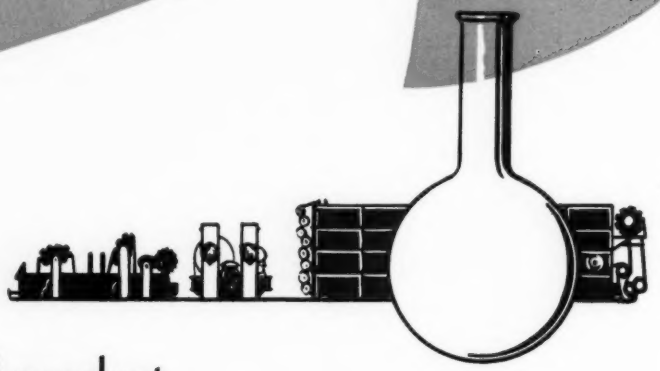

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Here at Ciba, we realize that because of its wonderful physical properties the use of Nylon alone or as a blend component is constantly increasing . . . and the dyer's problems in direct proportion.
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FOR DYE LIQUORS AND PRINT PASTES

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PRINT PASTES: Unlike ordinary de-foaming agents, **DEPUMA does not emulsify** when added to acid or alkaline liquors or print pastes. It has **no rate of evaporation.** When stirred in, it slowly rises to the surface, breaking the foam with amazing effectiveness. When added to print pastes, it does not affect the viscosity, thus preventing undesirable penetration during the printing operation.

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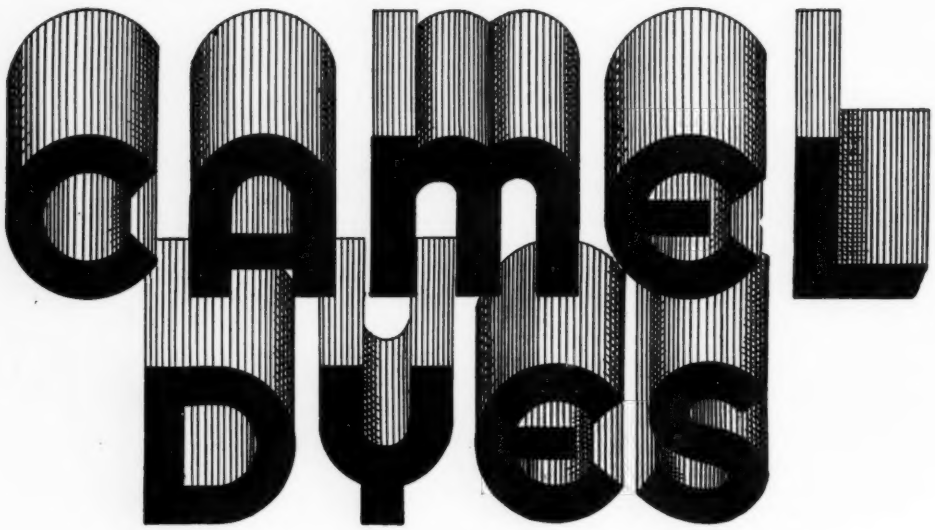

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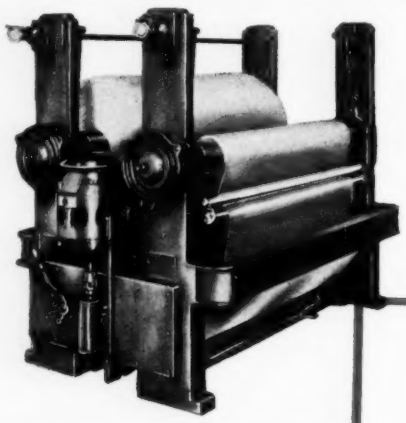

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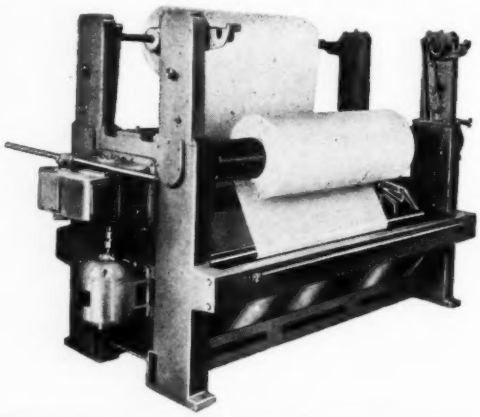

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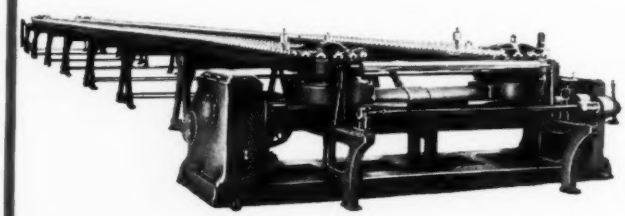

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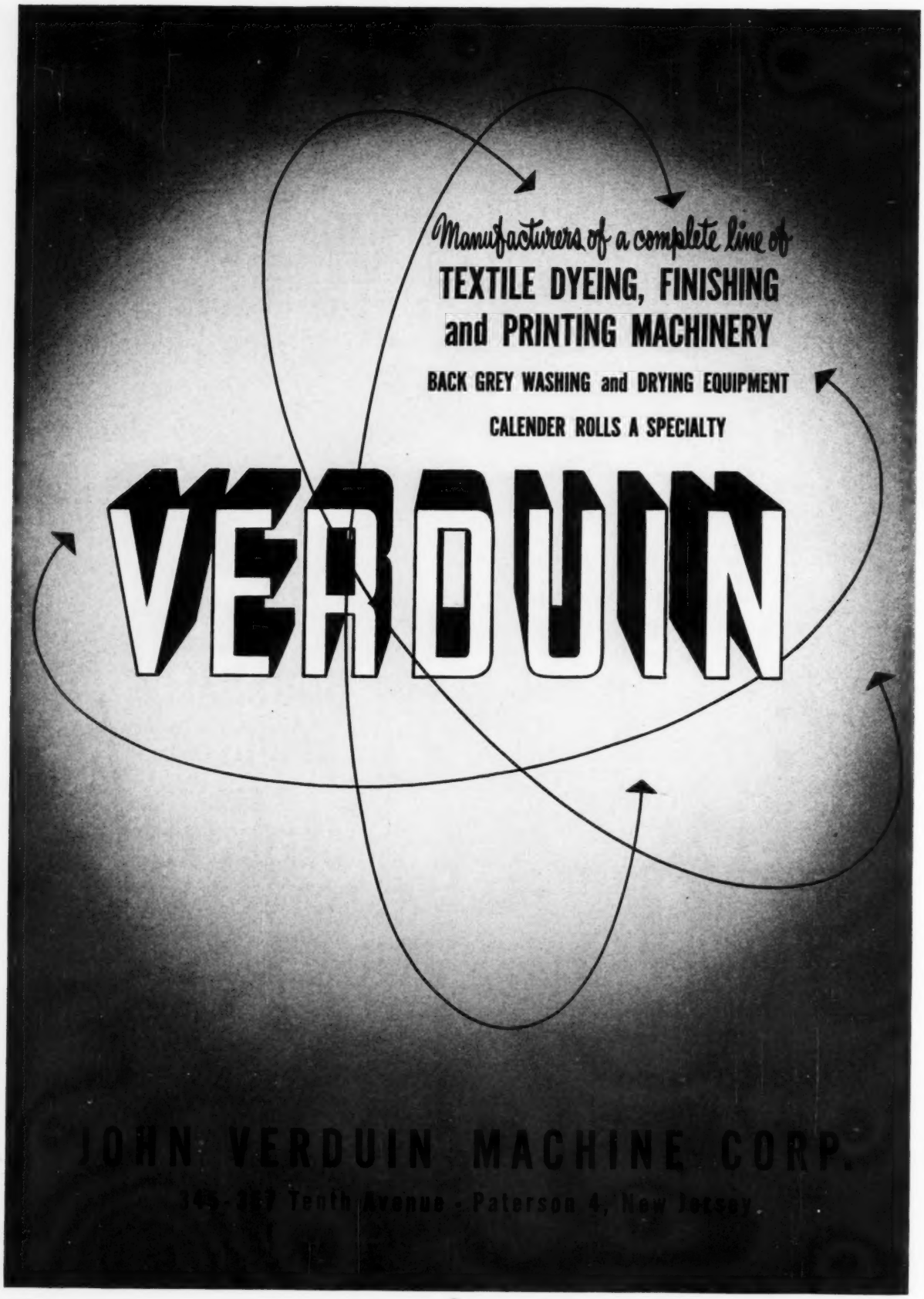
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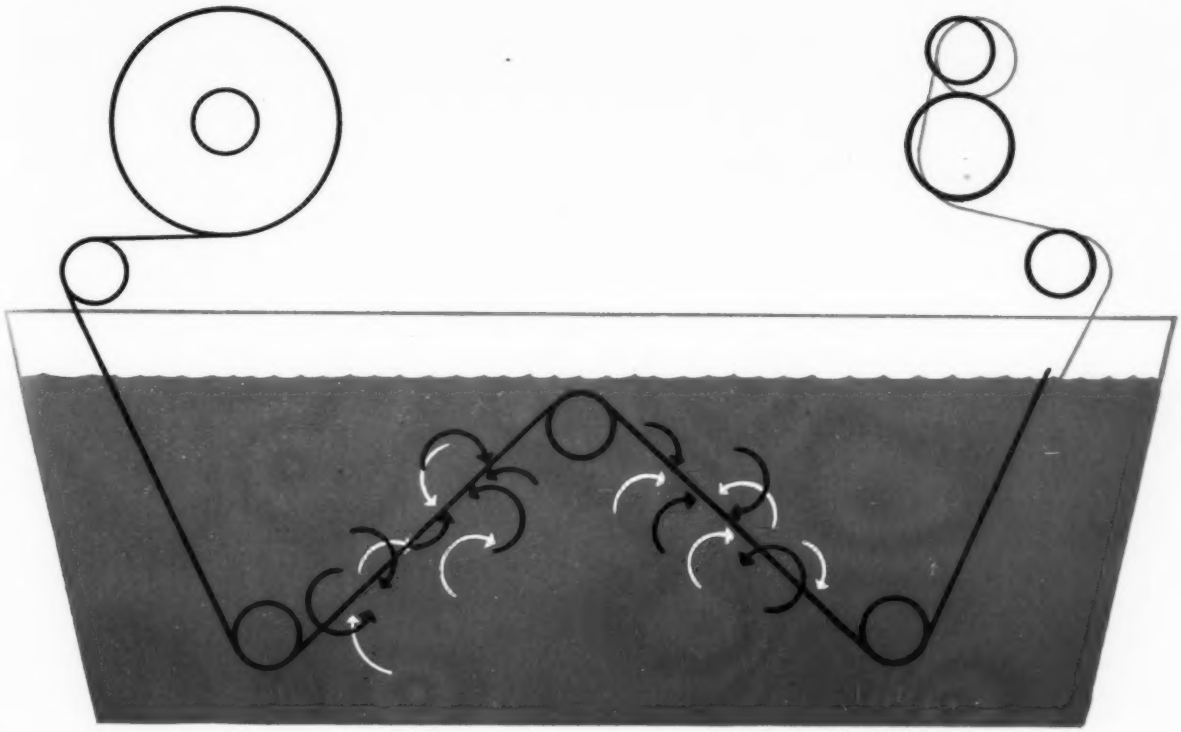

even dyeing . . . softer feel . . . with SANTOMERSE No. 1 in the jig

Economical, efficient Santomerse No. 1, used in jig dyeing, aids in level coloring and a softer feel to cotton and rayon piece goods. Santomerse No. 1, the all-purpose detergent and wetting agent, is an able assistant whether the jig is used to apply direct dyestuff, acid specialty colors, vats, sulfurs or naphthols.

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1. Fill jig to volume of 75 gallons of water. **2.** Add one to two pounds of Santomerse No. 1 at 120° F. **3.** Place goods on shell. **4.** Add half necessary dyestuff at one end and run cloth completely through. **5.** Add remainder of dyestuff and give goods another end. **6.** Give goods two more ends, dividing over each end an equal amount of common salt to exhaust dye bath. **7.** Drop bath. Rinse thoroughly, giving one rinse to each end. Many dyers and finishers add Santomerse No. 1 to the rinse to get a softer feel to goods. In the dye bath, Santomerse No. 1 serves as a penetrant to carry color all the way through every fiber. It makes the rinse more efficient.

Santomerse No. 1 is efficient in hard or soft water . . . in hot or cold solutions . . . in acid or alkaline baths. In any scouring operation, it lifts out particles and holds them in suspension to be carried off in the rinse. Santomerse No. 1 rinses out quickly . . . thoroughly.

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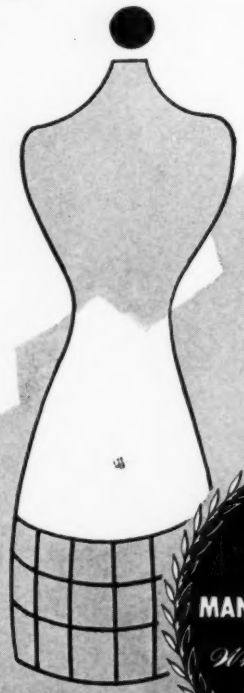

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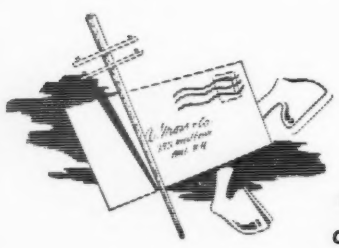

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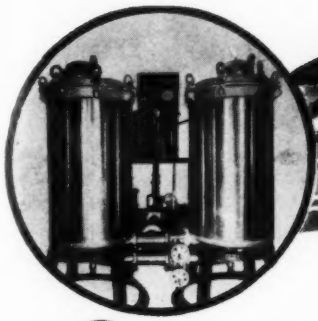

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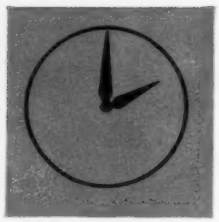

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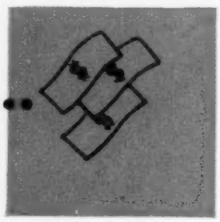

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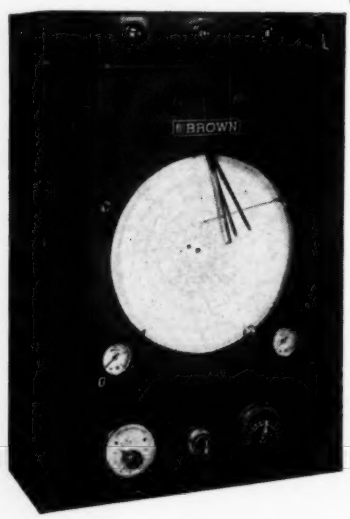

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Proteolytic type liquid de-sizing agent. For de-sizing fabrics containing gelatin, casein, soya and other protein and albuminous sizes. Produces a finer, softer hand, more uniform quality, clearer cross dyes.

In conjunction with any enzyme preparation . . . SACON . . . a non-ionic wetting agent and detergent. It is compatible with enzymes and is applicable in neutral, acid or alkaline solutions.

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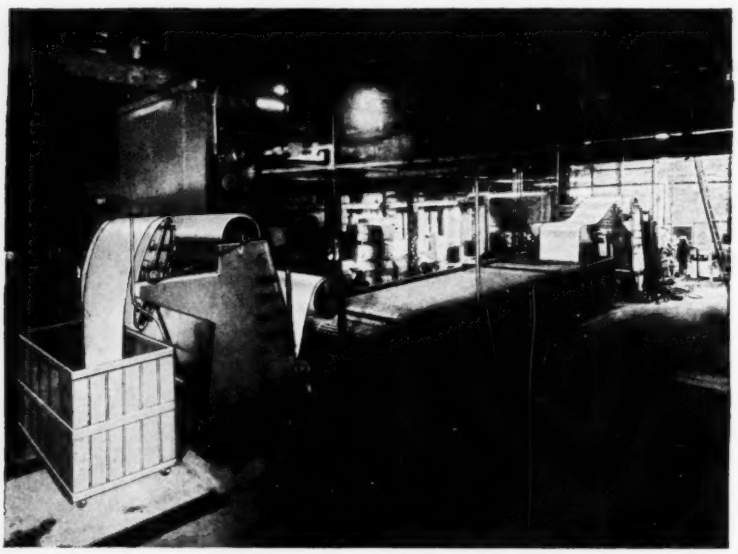
For Synthetics and Cottons

in ONE operation

DESIZE, BLEACH, SCOUR and WASH and/or CAUSTICIZE, ACIDULATE and WASH



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SAVE TIME – **The new process requires 40 seconds for desizing, bleaching, and preparing for scouring, cleaning, etc.—in one continuous processing —no transfer of goods.**

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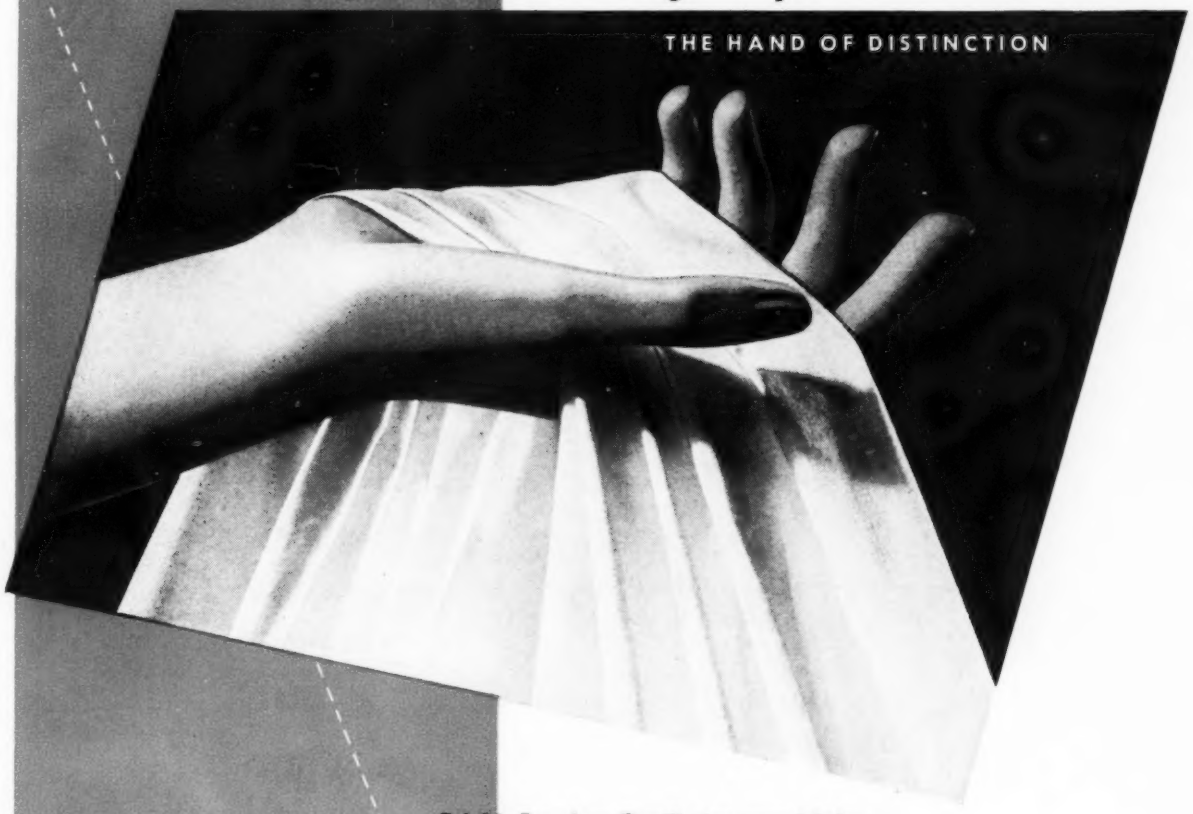

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the soft, smooth, silky *hand*
that distinguishes them above all others!
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Sulphated Olive Oil *plus*
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Now is the time to plan for bleaching modernization. Your production can be met by a Du Pont Continuous Peroxide Bleaching System which can be designed and built to your specific requirements by prominent textile machinery manufacturers. Look into these systems. You'll find them:

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2 **Flexible, readily adapted to speedy, economical, uniform processing.**

3 **Easy to set up, operate and control.**

Although Du Pont does not build or sell equipment, an analysis of your bleaching requirements and assistance in laying out a system to meet your specific needs can be obtained from Du Pont Technical Service. Technical Service Representatives, located in important textile centers, are available for assistance in starting operations and training of your technical and operating personnel.

DU PONT

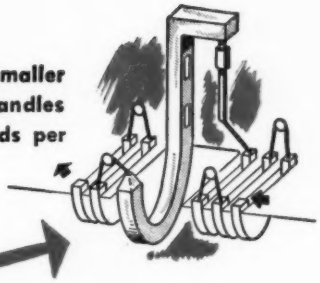
DU PONT CONTINUOUS PEROXIDE BLEACHING

BETTER THINGS FOR BETTER LIVING... THROUGH CHEMISTRY

Pick one of these Du Pont CONTINUOUS systems to meet your bleaching requirements

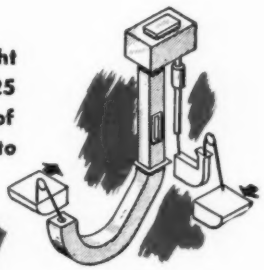
500 lbs./hr.

Extremely compact single-stage unit for the smaller plant or for specialty bleaching in larger plants. Handles cloth continuously at average rate of 50 yards per minute. Two-stage unit is also available.



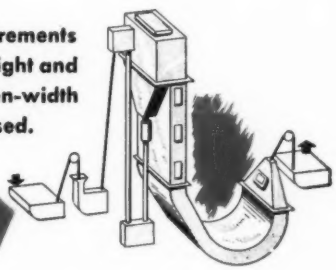
900 lbs./hr.

Flexible arrangement permits installation as straight line or grouping around "J" Box. Requires only 325 to 500 sq. ft. floor space. Handles 25 to 125 yards of cloth per minute. Matched units can be added to increase capacity.



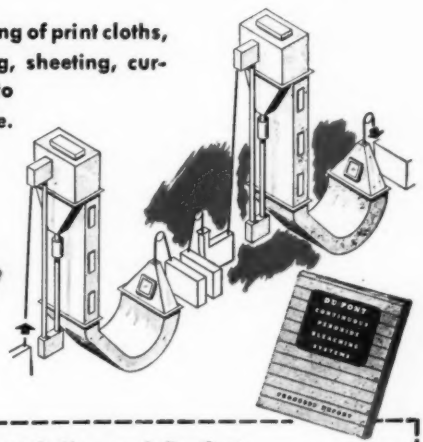
1500 to 3000 lbs./hr.

An excellent arrangement for production requirements of 200,000 to 400,000 yds. weekly. Handles light and heavy constructions. Also available in open-width design for goods that cannot be rope-processed.



3000 to 10,000 lbs./hr.

Recommended for large-scale bleaching of print cloths, terry toweling, colored yarn, shirting, sheeting, curtain material, etc. Can be designed to process up to 350 yds. per minute. Open-width design also available.



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Rodney Hunt Machine Co., Orange, Mass.
Wiesner-Rapp, Inc., Buffalo, N. Y.
Sir James Farmer Norton, Ltd., Manchester (England)

SEND FOR THIS BOOK. It gives more information about these systems, typical designs, illustrations and data about installations in leading textile mills. Just clip the handy coupon.

E. I. du Pont de Nemours & Co. (Inc.) AD-5
Electrochemicals Department, Wilmington 98, Del.

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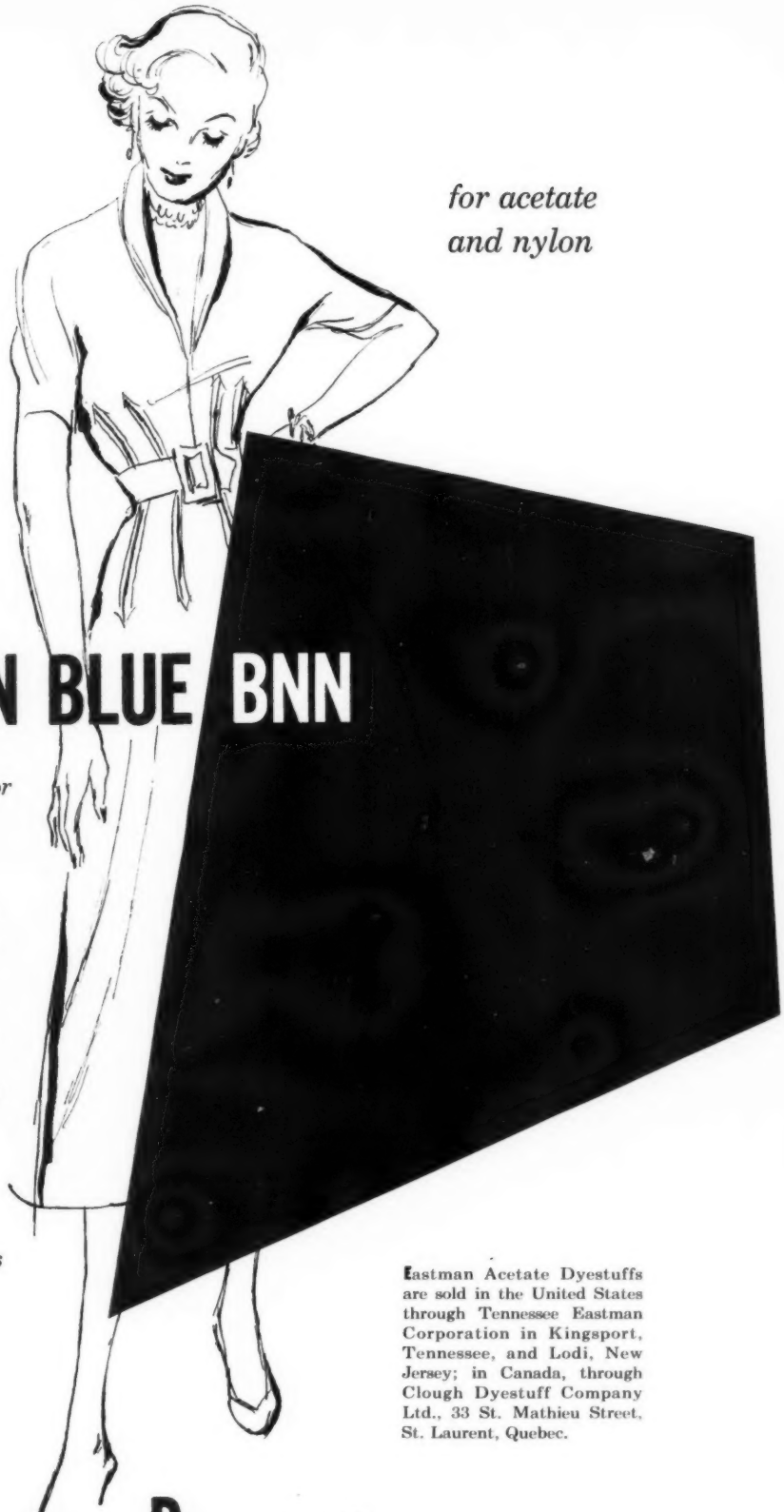

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Low in cost, with excellent color value, Eastman Blue BNN occupies a number-one spot in drug rooms throughout the industry. Its light fastness properties, its superior dyeing characteristics, its suitability for cross dyeing and its color constancy under artificial and natural lighting are all good reasons why this dye is so well known and widely used.

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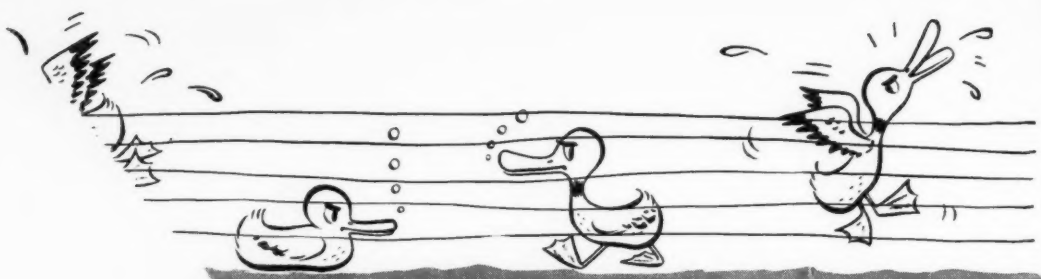
Eastman Acetate Dyestuffs



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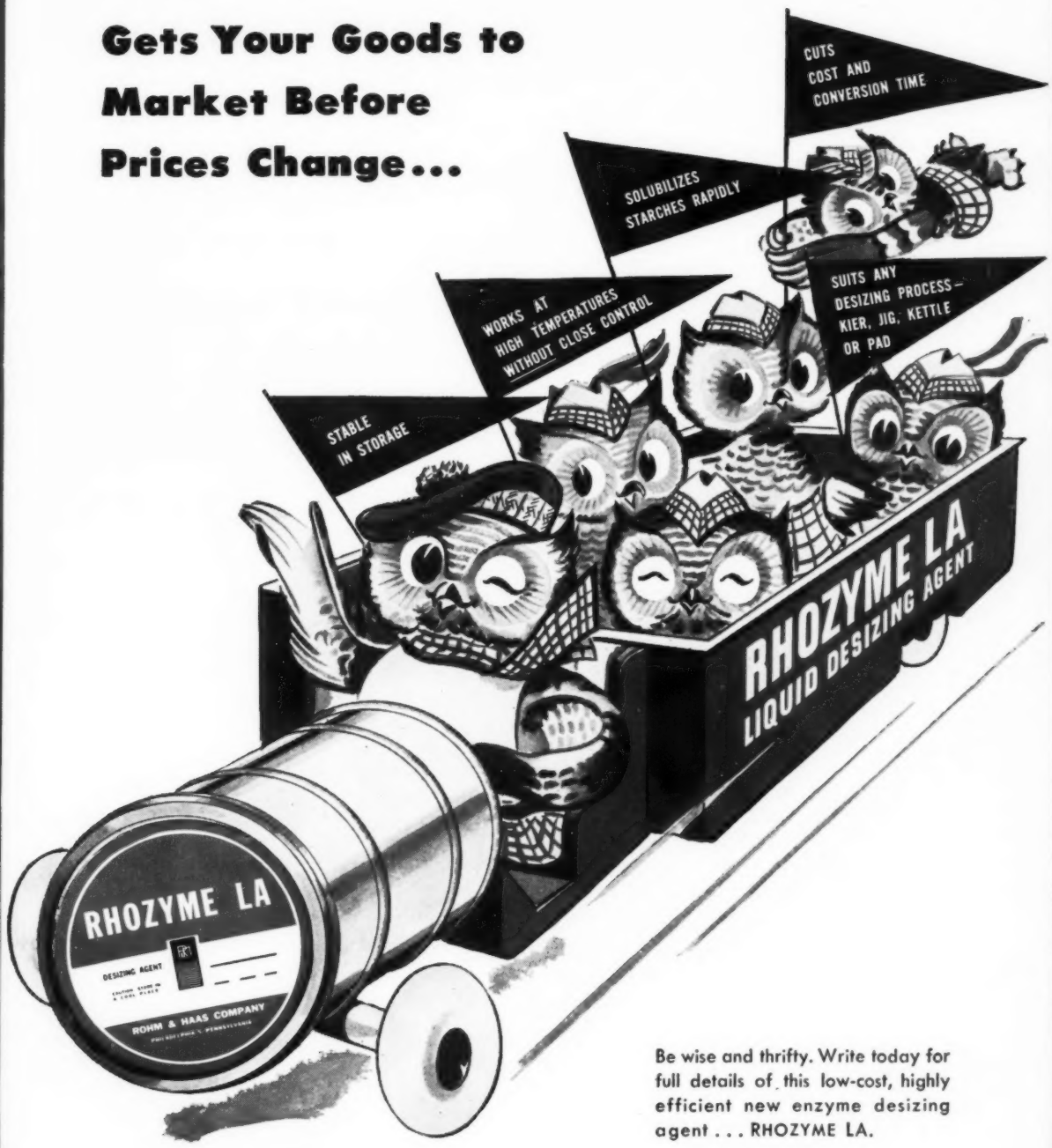

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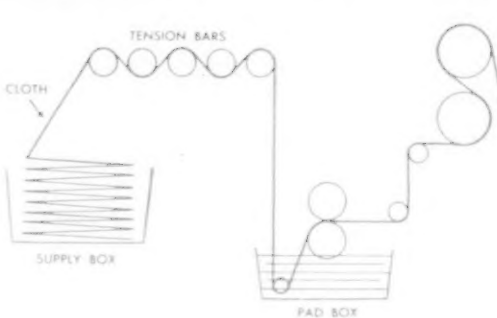

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- Makes fabrics uniformly absorbent for mechanically controlled shrinkage processes
- Excellent wetting agent for package dyeing . . . leaves yarns more absorbent
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- Effective wetting agent for dying woolens and worsteds with metallized dyes
- Unaffected by strong acids
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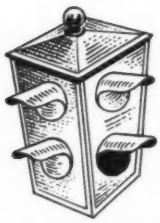

A straight road . . . no cross-traffic . . . no detours—to the motorist that means a continuous stretch of easy, trouble-free driving—*planned for maximum safety*.

Diastafor brand de-sizing agent—Type L—has been *planned for safety*, too—especially developed to bring safe, easy, trouble-free performance to your dyeing and finishing operations. In the continuous process, Diastafor L assures you good results for every yard and every mile of your finished goods.

When you have to deal with variables—and no two lots coming to your mill are alike—an all-purpose de-sizing agent like Diastafor L enables you to take in your stride the problems that constantly arise. Diastafor L will work well in an unusually wide range of temperatures and pH. It's the first choice of bleachers and dyers because of its fine performance under widely varying conditions.

You'll get continuously good results with Diastafor L whether you're working with cottons, rayons, or mixed goods. You can depend on it for superb performance and a fine finish even on your hardest lots.

Diastafor helps keep dyeing even and unshaded—with no streaks or blemishes—no impairment of tensile strength. And its economy is worth investigating, too, for you get more enzymes per penny with Diastafor.

It's really no wonder Diastafor has been the leader in its field for over 40 years. If you haven't used Diastafor in your mill, why not try it and see for yourself the "miles of safety" it brings to your finishing? For further information, write Standard Brands Incorporated, *Diastafor Department*, 595 Madison Avenue, New York 22, New York.

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Brown 2G produces a bright yellow Brown of excellent fastness to washing at a low cost.

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THESE NEW BROWNS,

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American Textile Machinery Exhibition Number

AMERICAN

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Official Publication of the Proceedings of the American Association of Textile Chemists and Colorists

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MAY 1, 1950
VOLUME 39 NUMBER 9

Contents

Contents of previous issues can be found by consulting the Industrial Arts Index and the Engineering Index, Inc. at your library

• Special Articles

American Textile Machinery Exhibits..... 277

Identifying Textile Fibers for Dyeing..... 292
E. A. W. Boyce

• Departments

Patent Digest 287
Paul Wengraf

Abstracts 290

Trade Notes—New Products..... 309

• Proceedings of the American Association of Textile Chemists and Colorists

Ample Accommodations Available for Portsmouth Convention P293

General Technical Session:
The Catalytic Degradation and Oxidation of Cellulose P294
W. George Parks, John G. Erhardt, Jr. and Donald R. Roberts

Hosiery Group:
Nylon Staple in Hosiery.....P301
D. H. Heckert

Report of Southeastern Section.....P303

Report of New York Section Meeting.....P303

Spring Meeting, Mid-West Section.....P303

Employment Register P303

Notice to Authors of Papers.....P304

Evans to Address Philadelphia Section.....P305

Membership Applications P305

Calendar P308

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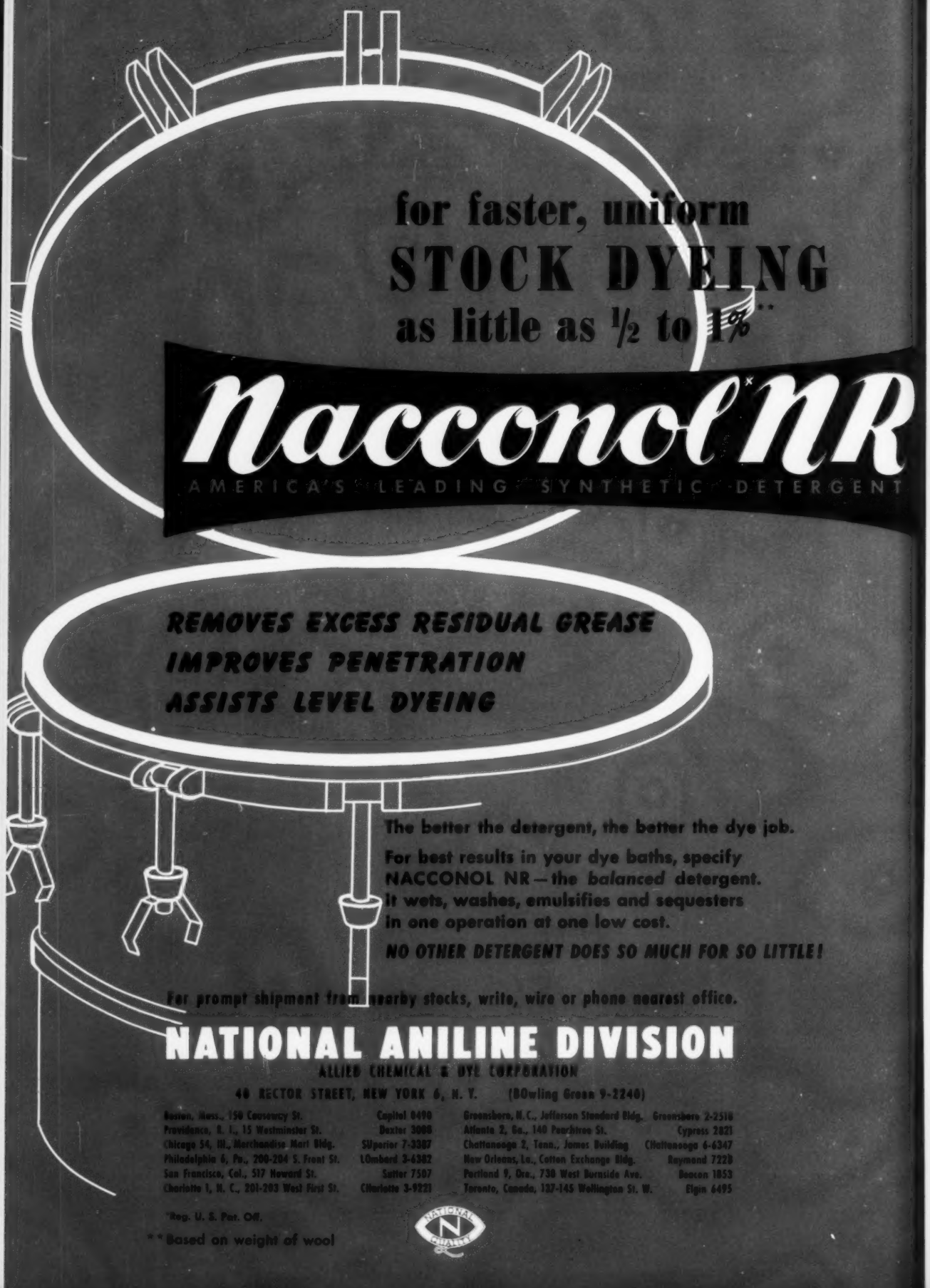

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**Based on weight of wool

American Textile Machinery Exhibition Number

AMERICAN

DYESTUFF REPORTER

VOLUME 39 MAY 1, 1950 NUMBER 9

AMERICAN TEXTILE MACHINERY EXHIBITS

THE 1950 Textile Machinery Exhibit, slated for May 8-12 inclusive at the Atlantic City Auditorium, Atlantic City, N. J., promises to be one of the most important of its kind in both size and scope.

Hours for the exhibit will be from 10 A. M. through 6 P. M. each day with the exception of Wednesday when the booths will remain open until 10 P. M.

AMERICAN DYESTUFF REPORTER will occupy Booth 711 and we will be looking forward to a visit from you during your stay.

Exhibit descriptions of interest to those in the wet-processing, testing or allied phases of the industry are alphabetically listed below, followed by the listings of all other exhibitors and booth numbers.

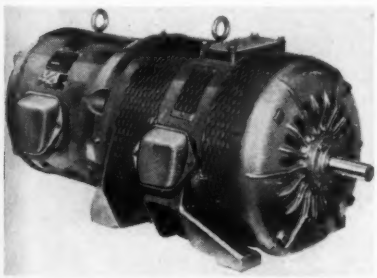
* * * * *

Abington Textile Machinery Works

19 Congress St., Boston, Mass.
Booths 200-205

The exhibit will consist of the very latest developments in machinery, shown for the first time by Abington. On display will be: laboratory dyeing equipment, Abington noil conveyor on comber, dumper receiver and filter receiver, Abington Pump and Motor, Abington Hand Knotter.

In attendance: Sumner Smith, Sr., Treasurer; Frank E. Rowe, Jr., Gen'l Manager; Fred H. White, Sr.; Walter W. Watt; John W. Burbine; Samuel Baugh II, Export Manager; Fred H. White, Jr.; Gaston H. Boyd; Sumner Smith, Jr.; Ernest Clark, Factory Manager; Frank J. Richardson; and Oliver H. Ramo.



Louis Allis Adjusto-Spede Variable Speed Drive

Aetna Felt Company, Inc.

204 Centre St., New York, N. Y.
Booths 808-809

The company plans to exhibit a complete line of specialized felts used by the textile industry. Of particular importance to finishing superintendents will be this firm's complete line of decating cloths.

Air-Perme-Ator Mfg. Co.

300 Preakness Ave., Paterson 2, N. J.
Booths 86 & 87

The exhibit will feature the latest Model B-5 for complete air control. This large capacity model will have all automatic controls such as automatic drainage, automatic flushing and automatic air intake. A method of combining with heating and cooling for year 'round temperature control will be demonstrated.

Conditioning Cabinets used for storage, conditioning and processing of yarns and cloth will be on hand, equipped with humidity and temperature ranges to meet specific requirements. The exhibit will also include a working model for demonstration purposes.

In attendance: Edward Kohut, General Manager; Richard Burr and Herbert Kresse, Sales Representatives.

Allen-Bradley Co.

Milwaukee 4, Wisc.
Booths 27 & 28

This display will consist of a complete line of motor control equipment for textile machine applications.

In attendance: F. F. Loock; President; J. J. Mellon, Chief Engineer; F. Fisher, Assistant Chief Engineer; G. F. Pain, Philadelphia District Manager; C. M. McCoombe, Boston District Manager; and H. Rosenkrantz, Advertising Manager.

The Louis Allis Co.

Milwaukee 7, Wisc.
Booths 30 and 32

This exhibit will feature the company's Adjusto-Spede variable speed drive.

In attendance: Ralph Owen, Chief Application Engineer; Maurie Weitekamp and Bill Canfield, Sales Engineers.

American Instrument Company, Inc.

8030-8050 Georgia Ave., Silver Springs, Md.
Booth 805

This exhibit will consist of the following instruments: Schiefer abrader, fabric compressometer, flexometer, Aminco Humidity-Temperature Test Apparatus, Aminco Portable Temperature and Humidity Indicator.

In attendance: C. E. Ohlheiser, Manager of Humidity Department, and F. C. Quinn, Sales Engineer.

Aminco Humidity-Temperature Test Apparatus

American Moistening Company

260 West Exchange St., Providence, R. I.
Booths 115-117

The following will be exhibited: Humidification and Evaporative Cooling Systems, Atomizers, Humidity Controls, and Humidification Devices.

In attendance: H. B. Bradford, General Manager; Providence Representatives N. B. Chase, H. R. Rich, M. H. Irons, L. Blau and W. Everett; Charlotte Representatives M. McCall (D. M.), J. E. Boston and B. A. West; Atlanta Representatives J. D. Johnson, W. L. Johnson, J. H. Waldrip and W. A. Mullins; and Boston Representative W. P. Woodcock.

American Textile Engineering Inc.

Arlington, N. J.
Booths 603 & 604

ATE will exhibit the following machinery: An electrical Yarn Singeing Machine (Mettler Patent) Form #531, an Autodinamografo Dynamometer for automatic testing and recording of elongation and breaking strength of yarns (Pagnacco Patent), and an Oxy Neutralizer for static elimination on all types of textile machinery (Herbert patent).

In attendance: John F. Dulken, Textile Engineer; C. F. Egues, Domestic Sales; A. Hefti, A. R. Robbins, and H. C. Sonntag, Engineers; P. A. Reuter, Chief Engineer.

Birch Brothers, Inc.

Somerville, Mass.
Booths 397-399

The following equipment will be exhibited: Heavy Duty Ball Bearing Scutcher, Patent Adjustable Slot Vacuum Extracting Box, Two Roll Padder or Squeezer, Traverse Plaiter for handling cloth in rope form, Stainless Steel Adjustable Spiral Opening Roll Unit, Conical Opener or Spreader, Angular Guide, Patent Rubber Expander Rolls, High Speed Tacking Machine Head, Patent "Supreme" Butt-Seam Grey Room Sewing Machine, "Coronation" Chain Stitch Sewing Machine, "Excel" Sewing Machine Head, Universal Yarn Assorting Balance.

In attendance: Harold W. Birch, John C. Cosby, Clifford W. Birch, Jr. and Richard Briggs.

Buensod-Stacey, Inc.

60 East 42nd St., New York 17, N. Y.
Booths 29, 30, 35 & 36

A complete humidifying system consisting of a central station type of air washer with air distribution consisting of the Buensod-Stacey Horizontal Low Level Diffusion System will be in operation and will be supplemented with the use of atomizing sprays under the control of a Buensod-Stacey Adjustable Intermittent Humidity Controller.

One of the basic requirements of the Central Station System has been the means of getting rid of lint. The exhibit will show the B-S Rotary Strainer, which is attached and integral to the water spray system in the humidifier, for taking out the lint as collected in the washer. Another new feature is the Auto-Airmat Lint Filter for filtering all of the air passing through the Central Station System which is automatic in its operation so that constant air volume can be maintained, and which is said to require very little, if any, maintenance. Still another feature will be the B-S Portable Electric Humidity and Temperature Indicator.

In attendance: A. C. Buensod, President; R. O. McGary, Vice President; Audrey H. Cross, Asst. Secretary; J. M. Sperzel, O. T. Merwin, R. M. Warren, Jr., M. L. Eakes, J. R. Clark, and J. C. Rose, Engineers.

Burlington Engineering Company, Inc.

Graham, N. C.
Booths 9 & 10

The following equipment will be shown: stainless steel dye beck, stainless steel package machine, stainless steel rotary dye machine.

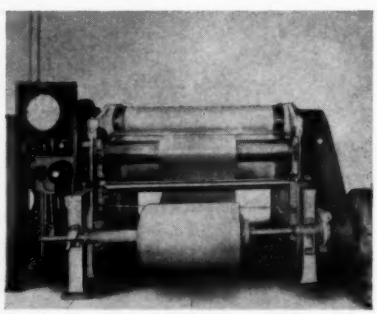
In attendance: J. Saunders Williamson, President; J. A. Okey, Vice President; and J. M. Dixon, Salesman.

H. W. Butterworth & Sons Company

Philadelphia 25, Pa.
Booths 538-547

Butterworth will exhibit their 2-roll Bullet Pad, the 2-Compartment Washer, the 2-roll Embossing Calender, and their New Ripple-Flo Overfeed Pin Tenter with Photoelectric Rail Guiders.

In attendance: Ebert Butterworth, Vice President in Charge of Foreign Sales; DeHaven Butterworth, Vice President and General Sales Mgr.; J. Hill Zahn and Gene Hunter, Southern Office Representatives; Edward S. Pierce and Fred Spoerl, Philadelphia Sales Office Representatives; Wallace Taylor and Stanley Brooks, New England Office Representatives.



Butterworth 2-Roll Embossing Calender

Carbomatic Corporation

24-81 47th Street, Long Island City, N. Y.
Booth 821

Carbomatic will exhibit its new Una-Ray infrared generator unit which has challenged attention by providing a novel means for nylon setting. It is available in various sizes to suit tenter frames, loop dryers with heat re-circulation, slashers, etc. It reportedly affords precision control of any working temperature within a 150°-500°F. range and ensures uniformity of color on both sides of fabric in drying operations.

Those in attendance will discuss the Una-Ray and other Carbomatic infrared devices adapted to drying, curing, singeing and all manner of textile heat-processing applications.

In attendance: F. M. Crossman, President; Dr. J. D. Milburne, Technical Director; and H. E. Linderson, New England Representative.

Carbomatic Infrared Unit

Cook P-N Machine Co., Inc.

365 Dorchester Avenue, Boston 27, Mass.
Booths 606-608

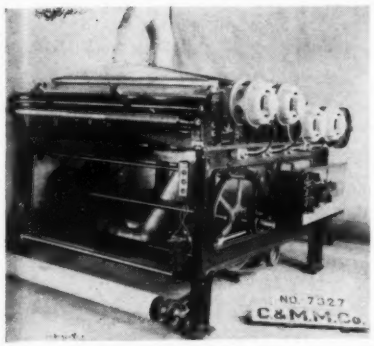
Padding Machines, Stainless Steel Saturating Machines, Patented Photo Electric Control and the Patented Detwisting Machine will be exhibited.

In attendance: Perce Cook, President; James Cook, Vice President; Bob Angel, John Stearns and Ernest Cook.

Curtis & Marble Machine Co.

Worcester 3, Mass.
Booths 134-137

C. & M. will exhibit their S2A-Unispeed Inspector and their Type CMR Shearing Machine with Automatic Seam Protector. The former has been devel-



Curtis & Marble CMR Shear

oped especially for inspecting rayons. It combines the center wind and constant speed; the speed is adjustable to requirements. Another feature is the self-supporting arbor, ordinarily made collapsible for convenience in removing a roll. However, it may be made with grip blades in case the rayons are to be wound on a paper tube. The machine is arranged with forward and backward motion and measuring attachments.

The CMR Shearer now uses a Pneumatic Timer in place of the Electronic Director formerly used. Suction draws the hanging threads from either surfaces or selvages into cutters where they are removed. Individual built-in motors are used for cutting parts. The motors reverse automatically and rub in the same direction until seams pass, after which they reverse and resume rotation in the cutting direction.

In attendance: Ralph Marble, General Superintendent; L. F. Remington, Chief Engineer; Walter F. Woodward, Southern Rep.; Robert E. Steere, New England Rep.; and F. H. MacKay, Service Supervisor.

Diehl Manufacturing Co.

Somerville, N. J.
Booths 259, 260 and 260AA

The following general types of products will be shown: Special Purpose Motors for driving looms, spinners, twisters, warpers, winders, coppers, cards, dryers and other machinery for silk, cotton, rayons and woolens; Standard Open (Drip-Proof), Splashproof and Totally Enclosed (Fan Cooled and Not Fan Cooled) Motors including Dust and Vapor Explosion Proof designs; Creel Fans; and Exhaust and Ventilating Fans.

In attendance: W. O. Langille, and C. F. Bruder, Vice President; W. J. Jockers, Sales Manager; H. B. Thorpe, Textile Representative; R. D. Ingalls, Chief Engineer; A. R. Booth, New England District Manager; J. S. Wood, Philadelphia District Manager and H. W. Kloth, Advertising Manager.

E. I. DuPont de Nemours & Co. Finishes Division

Wilmington 98, Del.
Booth 227

This exhibit will feature DuPont "Color Conditioning" and its application to the textile industry. It will illustrate several actual applications of this scientific painting plan in outside textile plants, in full color. All the selected paint colors making up the program will be exhibited.

In attendance: S. W. Quisenberry, Manager Maintenance Sales; M. J. Hanger, Southeastern Trade Sales Manager; W. B. Tatum, Southeastern Maintenance Sales Manager and L. E. Whitmoyer, Eastern Maintenance Sales Manager.

Fielden Electronics Inc.

1171 New York Ave., Huntington Station, N. Y.
Booth 814

The Fielden Drimeter, moisture content measuring and controlling equipment for all types of cloth finishing and slashing will be displayed. A full range of controls for every type of dryer and slasher will be available.

In attendance: Ralph V. Coles, Vice President; David S. Bunch, Jr., Sales Engineer; and John Varley, Engineer.

Fletcher Works

Glenwood Ave. & Second St., Philadelphia 40, Pa.
Booths 453-462

Post-war developments in narrow fabric looms, throwing machinery for rayon and nylon, and centrifugal extractors will be featured in conjunction with the company's 100th anniversary. Among the entirely new machines will be the "Twintainer" extractor, with removable containers having self-dumping and labor saving advantages.

In attendance: Robert J. Bartholomew, President; Fletcher Schaum, Vice President; W. H. Rometsch, Sec'y & Treas.; Charles W. Moore, John M. Crozier, Warren Egee, Raymond Winward, T. B. Baldridge, Jr., T. M. Jackson, Jr., and Southern Representatives F. W. Warrington and George Dudley.

The Foxboro Company

Foxboro, Mass.
Booths 451 & 452

Features of Foxboro's exhibit will include:

(1) The Model 40 CycleLog Controller for automatic control of dyeing cycles and similar batch operations, without the use of cam-mechanism or auxiliary equipment. This will be shown in operation under simulated actual conditions.

Foxboro Model 40 CycleLog Controller

(2) Multi-Record Dynalog, exhibited as used for air-conditioning applications, with zone-type chart for recording dewpoint and dry bulb temperatures at different locations.

(3) Dynalog Recorder, demonstrating response to temperature change Other measuring elements will be shown for use with Dynalog Instruments including pH Cells, Conductivity Cells, Roll Surface Temperature Measuring Heads (for calendars and other roller-type machines), Tachometers, and Dynatherm Bulbs.

(4) Density Controller.

(5) New Deferred Action Elapsed Time-Temperature Controller, for automatic control of the cooking and storage of size, in the same kettle.

(6) "Packaged Unit" Control Cabinet.

(7) Pneumatic Loading Control, for dye jigs and other roll-type machines.

The exhibit will also include standard and familiar Foxboro instruments used in manufacturing and processing.

In attendance: C. E. Sullivan, Vice President and General Sales Mgr., Foxboro; W. H. Ridley, Manager, Textile Industry Sales Division, Foxboro; H. H. Michelmore and J. W. Gordon, Sales Engineers, Foxboro; Joseph Esherick, Manager, Philadelphia Branch Office; George Hammer, Sales Engineer, Phila.; G. E. Clark, Mgr., Baltimore Branch Office; S. C. Alexander, Mgr., Charlotte Branch Office, R. E. Beers, F. J. Pichard, and J. E. Booth, Sales Engineers, New York; and W. W. Barron, Mgr., Atlanta Branch Office.

Ernest L. Frankl Associates

22 East 40th St., New York 16, N. Y.
Booths 802-804

Frankl Associates are representatives of Mezzera, S.p.A., one of the most important European manufacturers of finishing equipment. Of special interest to the American market is the tensionless dye jig manu-

factured by Mezzera. Publicity material will be available.

In attendance: Ruggero Jucker, general manager of Mezzera.

General Electric Company

1 River Rd., Schenectady, N. Y.
Booths 563-578

This exhibit, in charge of the Apparatus Department, will emphasize electric motor drives and control for the industry. Shown will be adjustable-speed drives (speed variator, ACA motor, and Thymo-trol), slasher drives, standard and flywheel loom motors, screenless open textile motor electronic shuttle detector, yarn tension device, totally enclosed water cooled motor, loom switch, and assorted control. Also, murals on power distribution and card drives, and a model of a unit substation. Many of the items will be operating, and some can be operated by spectators. The newest equipment includes the yarn tension device and the totally enclosed water cooled motor.

In attendance: J. M. Olive, Exhibit Specialist; J. W. Holt, Mgr., Textile Industries Section, Industrial Divisions; C. B. Keolliker and R. P. Kloeti, Textile Industries Section, Industrial Divisions; R. R. Prechter, R. J. Demartini, and R. R. Lang, application engineers, Industrial Engineering Divisions.

David Gessner Company

Worcester 3, Mass.
Booths 206-211

This display will include Finishing and Shrinking Machinery. The new Semi-Decating Machine will be a special feature.

In attendance: John P. Franklin, President; James Barr, Sales Manager; Richard C. Franklin, Richard L. Bernard and Theodore Dourdaville, Salesmen.

The Girdler Corporation

224 E. Broadway, Louisville, Ky.
Booths 49 & 50

Votator apparatus for the production of improved warp size will be displayed. This apparatus is for continuous processing of viscous and liquid material in a closed system.

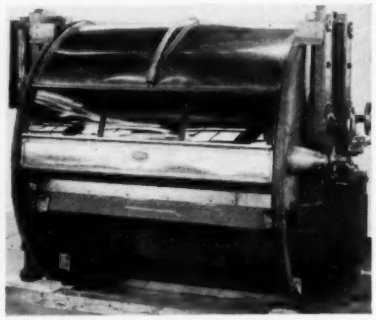
In attendance: Lamar Roy, Sam Welch, J. P. Thurman, Harold E. Huber and Gene Wedereit.

Glasco Equipment Corporation

2 Wait St., Paterson, N. J.
Booth 810

Photographs only will be displayed of Glasco's Stainless Steel Dye Boxes, Stainless Steel Jig Enclosures, and Stainless Steel Trucks.

In attendance: M. G. Peck, President; F. H. Hadnewald, T. H. Currier, J. O'Connor and J. Lukas, Sales Representatives.



Glasco Stainless Steel Jig Enclosure

Hart-Moisture-Meters

New York 17, N. Y.
Booth 613

Display will consist of instruments for accurately and instantaneously gauging the moisture percentage in the materials of the textile industry in all forms.

In attendance: Raymond S. Hart and William E. Barnett.

The Hermas Machine Co.

Hawthorne, N. J.
Booths 341, 342, 343, 343AA

A Shear, a Brush, an Inspecting Machine and a Sewing and Feeding Machine will be displayed.

In attendance: G. P. Mason, Vice President; R. R. Simpson, R. H. Kelley and L. M. Kimberlain, Sales Representatives.

E. F. Houghton & Co.

303 W. Lehigh Ave., Philadelphia 33, Pa.
Booths 370-370AA

Houghton will display new developments in warp size compounds, surface active agents, rayon and wool oils, textile lubricants and leathers. Reduction in kettle cost of warp size compounds and better control of the sizing process will be featured. A complete line of surface active agents developed in recent years, including concentrated wetting agents and detergents, will be displayed.

In attendance: D. J. Richards, Vice President—Sales; Frank Ross, Asst. to Vice President—Sales; W. H. Brinkley, General Sales Manager, Southern Division; J. R. Clendenning, Sales Manager, Eastern Div.—South; C. B. Kinney, Manager, Textile Sales Dept.; O. H. McClay, H. E. Peterson, and H. H. Kirkpatrick, Sales Representatives.

Paul Parker Photo

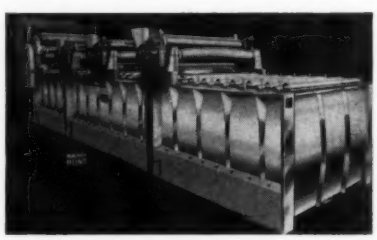
Hart Moisture Meter

Rodney Hunt Machine Co.

Orange, Mass.
Booths 159-164

Rodney Hunt plans to feature their line of textile washing machinery. In the 20' x 30' exhibit space they will have actual production models of both their Tensitrol Rope Washer and their Tensitrol Open-width Washer. The machines will be in operation demonstrating a new principle in wet processing. Goods in both rope and open-width forms pass through these machines in a completely relaxed condition, designed to eliminate troubles due to stretching, shrinkage, etc.

In attendance: E. F. Harris, Vice President; B. M. Jones, Mgr. of Textile Machinery Division; H. F. Creegan, M. G. Hopkins, L. M. Phillips, T. W. Kitchen, H. H. Belcher, and C. H. Amidon, representatives of the Textile Machinery Division; J. W. Rembe, Export Manager; W. J. Simonds, Sales Manager, Industrial Rolls Division.

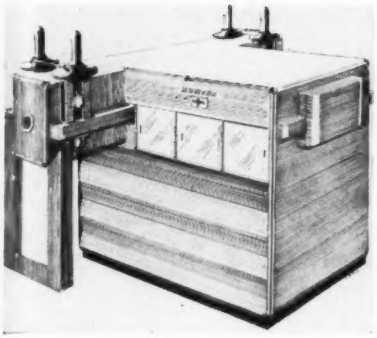


Rodney Hunt Tensitrol Open-Width Washer

James Hunter Machine Company

North Adams, Mass.
Booths 113, 114, 218-221, 228-231, and 45AA

Hunter will exhibit an adjustable reel Dye Kettle which is capable of dyeing sample pieces from a few yards to a



Hunter Flexreel Tensionless Washer

complete cut, and a new stainless steel Open Soaper for rayon and cotton finishing.

The highlight of this exhibit, however, will be the most recent innovation for tensionless scouring in the wet processing field, the Flexreel. Models illustrating the principle of the Flexreel Washer as well as full-scale production units will be in operation. The Washers are of both the Rope and Open Width types, applicable to caustic and peroxide washing in continuous bleach ranges, desizing, print washing, grey washing, and rinsing of cottons and synthetics after resin treatment, etc. They are also applicable to neutralizing of woolens and worsteds.

The Industrial Dryer Corporation

Stamford, Connecticut
Booths 103 & 104

The "H-W" Conditioner for 15 denier monofilament nylon hosiery will be shown arranged for all electric operation. Conditioner will be completely automatic so that stockings are conditioned and, after the conditioning period, dried. Fifteen denier monofilament nylon stockings are conditioned immediately after knitting and prior to looping and seaming.

In attendance: P. H. Friend, J. R. Tutt and F. W. Caesar. Also representatives of the W. J. Westaway Co. Ltd. of Hamilton, Ont. and Montreal, Que., and the W. A. Kennedy Company of Charlotte, N. C.

Industrial Steels, Inc.

246-250 Bent Street, Cambridge 41, Mass.
Booth 349

This display will be confined to Stainless Steel items used in the fabrication of textile equipment. This includes Stainless Steel sheets, hardware, fittings, valves, pumps, tubing and the company's exclusive 100 grit Stainless Steel sheet finish tubing.

In attendance: F. A. Gorman, Vice President-General Manager; R. C. Cunningham, Manager Stainless Steel Sales; R. J. Chestnut, Paul Chapman, Robert Mason, Sales Engineers; and W. E. Fluke, Sales Promotion Manager.

M. W. Jenkins Sons, Inc.

444 Pompton Avenue, Cedar Grove, N. J.
Booth 354

Exhibit will consist of textile brushes of most all types including those used for color furnishing, brushing prior to printing, blanket washing and drying, soaping for screen printing, singeing, pressing, teasel cleaning, teaseling, polishing, steam brushing, shade cloth coating, thread dressing and pin tentering.

A display will be featured consisting of the Jenkins Metlkor cylinder brush, driven by a variable speed motor. The brush will be dynamically balanced so that when weight is attached, creating unbalance, the brush will be so mounted as to demonstrate the obvious effect. This will be arranged so as to be operated by the visitors at the show.

In attendance: R. B. Jenkins, S. E. Worden, F. Tantum, and A. J. Christensen.

The Johnson Corporation

805 Wood Street, Three Rivers, Mich.
Booths 800-801

A demonstration will be in operation on which will be installed the new Type "S" Self-Supporting Johnson Rotary Pressure Joint, new type Johnson Rotary Pressure Joint with body support lugs and the Johnson Speedheat System. The Joints are used on dry cans, sanforizers, slasher and calender rolls for the purpose of admitting steam or water, as well as other liquids and vapors to a rotating member.

In attendance: R. O. Monroe, President; R. W. Gotschall; and district representatives from New York, Boston, Philadelphia, Richmond, Charlotte and Atlanta.

Kearny Manufacturing Company, Inc.

Kearny, N. J.
Booths 601 & 602

Machinery to be exhibited by the company will be: a K.M.C. Midget Psychrometer for immediate determination of moisture in raw materials, yarns and fabrics; a Spraymeter for conditioning yarns on cops or skeins while being packed; a Hygrolit Yarn Conditioning Machine; and two domestic winders with conditioning devices.

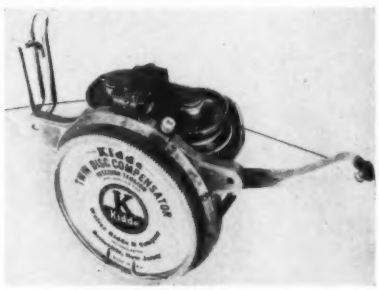
In attendance: C. F. Dulkin, President; Dr. K. Heyman, Chief Chemist; A. R. Robbins, Chemical Engineer; H. C. Sonntag, Engineer; W. O. Schlimbach, Manager of Domestic Sales, R. H. Sommer, Manager of Export Sales; N. L. E. Fawcett, C. F. Jones, Messrs. Mahon and Bone, W. P. Russel, George Westwater and C. C. Withington, Regional Representatives.

Walter Kidde & Company

Belleville 9, N. J.
Booths 44AA and 44BB

Tension Compensating Devices will be exhibited.

In attendance: C. L. Griffin, Jay S. Gosnell and D. M. Kroll.



Kidde Twin Disc Compensator

W. T. Lane & Bros., Inc.

Poughkeepsie, N. Y.
Booth 40

The types of canvas baskets, trucks and materials particularly applicable to the textile industry will be shown. The company will have one container at the exhibit especially designed for use in the dyeing and finishing processes, for the handling of damp and wet goods.

In attendance: R. T. Lane and J. M. Baker.

Lydon Brothers, Inc.

85 Zabriskie Street, Hackensack, N. J.
Booth 68

One of the company's latest Twist Setters and Conditioners which are applicable to silk, rayon, nylon, cotton and worsted will be on exhibit. Particular emphasis will be placed on the application of this equipment to Nylon Full Fashioned Hosiery and accessory equipment will be on display. Also featured will be Lydon Bros.' Drying Equipment for Skeins and Packaged Goods.

In attendance: T. Lydon, President; P. J. Lydon, Sec'y & Treas.; J. V. Calhoun and A. H. Forster of the Philadelphia Office; C. H. Gingher of the Greensboro, N. C. branch; and J. P. McBride of the Home Office.

Macbeth Corporation

Newburgh, N. Y.
Booth 362

A display of Macbeth cotton classing lights, together with color matching units and daylighting equipment. The principle new product will be a new color Densitometer together with Macbeth pH Meters of both laboratory and industrial type.

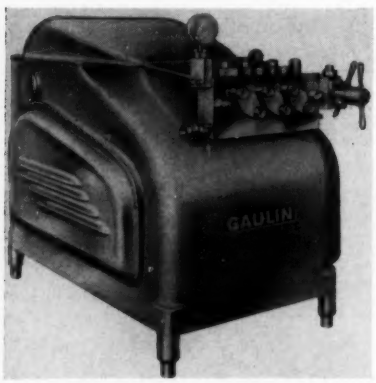
In attendance: Norman Macbeth, President; George E. Scofield, Vice President; J. F. Slaughter and E. F. Slaughter, Sales Representatives.

Manton-Gaulin Manufacturing Company, Inc.

44 Garden St., Everett 49, Mass.
Booths 6 & 7

The new Manton Gaulin Textile Homogenizer will be exhibited.

In attendance: Donald G. Colony, President & Gen'l Sales Manager; Harold P. Woodcock, Advertising Manager; Lance H. Rees, Technical Director; Henry C. Perry, Rep. for Northeast and Central Atlantic States; Robert E. Sidebotham, Rep. for Southern States; and Joseph J. Dwyer, Rep. for North Central States and Canada.



Manton Gaulin Textile Homogenizer

Marshall & Williams Corp.

46 Baker St., Providence, R. I.
Booths 212-217

The following M. & W. equipment will be in operation: High Speed Tenter Frame, #11 Roller Clip Type Tenter Chain, #10 Pin Type Tenter Chain, and Positive Overfeed and Guider. In addition there will be various types of tenter clips and parts on display.

The #10 pin type chain and the positive overfeed and guider will be shown for the first time. M. & W. are manufacturing the overfeed equipment under license from Tootal, Broadhurst, Lee Co., Ltd., of Manchester, England. It is claimed to have revolutionary advantages over similar equipment already on the market in that it provides a positive control of the amount of slack in the tenter dryer. It reportedly can accurately regulate this slack from —5% to +30%, operate at speeds up to 100 y.p.m., handle all types of cloth and is adaptable to existing types of tenter frames. It is also transferable from one type frame to another.

In attendance: Richmond Viall, President & Treasurer; John C. Nash, Secretary & Sales Manager; Fred C. Land, Southern Manager; Albert J. Cole and Joseph F. Smart, Sales Representatives; and James A. Love, Export Agent.

Mawaco Machine Company

56 Bogart Street, Brooklyn, N. Y.
Booth 806

This exhibit will be a display of photographs featuring the company's Decating, Sponging and other Finishing Machines.

In attendance: Max Winkler and Walter Schlaepfer.

Meese, Inc.

Madison, Ind.
Booth 359

The booth display will consist of a large background of blow-up photos illustrating the company's canvas baskets and trucks in operation in various industries. The display proper will consist of the actual baskets and trucks as well as specialty items.

In attendance: E. W. Meese, Sales Manager and Secretary; F. G. Hanson and J. A. Wurtz, Salesmen.

Minneapolis-Honeywell Regulator Co. Brown Instruments Division

Wayne & Roberts Aves., Philadelphia, Pa.
Booth 701

The Company will show new and complete models of measuring, indicating and controlling instruments; also valves and accessories. There will be an extensive showing of Brown Instruments and industrial valve divisions products for textile processing. Featured will be instrumentation for slasher, dye kettle, dryer, kier boiling, size cooking, bleaching and other operations. Among the newer devices will be a circular chart electronic Moist-o-Graph, and a program for dye kettle control. The line will include instruments for temperature, pH, speed, stretch and conductivity. Devices stressing their extreme sensitivity will be exhibited in a way to permit operation by visitors. New accessories will indicate growing trends to more modern textile processing. Several new types of valves will be displayed as well as newly developed Honeywell industrial controls for semi-decating machines and pneumatic regulation of squeeze roll loading pressures.

In attendance: Charles W. Bowden, Jr., textile industry manager; Drew Daubert, James C. Broughton, James Gilmore, Nels Evoy, J. D. MacNamara, L. F. Lawrence, J. E. MacConville, John D. Root and Harry D. Ruch.

Morrison Machine Company

1171-1225 Madison Avenue, Paterson, N. J.
Booths 433-448

Exhibit will include (tentatively, subject to change): Mercerizing Tenter, Pin Tenter, Compressive Shrinking Machine, Williams Units, Dry Can Stack, Laboratory Williams Unit, Padder and others.

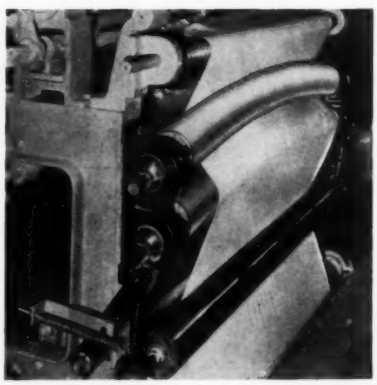
Expected to be in attendance: James L. Morrison, President; James R. Morrison, Vice President; John C. Morrison, Vice President; John Kreeft, Chief Engineer; A. C. Caporossi, Sales Engineer; Harold Lacey, Superintendent; C. W. Curts, Advertising Manager; D. M. McSpadden and B. B. Scantland, Southern Representatives; A. C. Freeman, Jr., New England Representative; K. T. Lendt and G. V. Lamont of Lendt & Company, Continental European Representatives.

Mount Hope Machinery Company

42 Adams St., Taunton, Mass.
Booths 371-371AA

The special feature will be a running demonstration unit, consisting of the following Mount Hope equipment:

An automatic Continuous Roll Feed with cloth level control and end of roll warning control, the new Electric Roll Lift Let-off, the Slack Selvage Eliminator, the Open Width Tension Device, Precision Guiders, Push button operated



Mount Hope Slack Selvage Eliminator

Bowed Weft Straightener and Combination Single and Multiroll Skewed Weft Straightener. In addition to this, the Mount Hope Standard Stainless Steel Guiders, Free Wheeling Expanders and other cloth and plastic handling devices will be on display.

Among the equipment listed above, newly developed features of a number of Standard units will be shown. The Electric Roll Lift Let-off, a new Center Bar Let-off with a push button control cloth roll lift, will be exhibited for the first time. A new 1½" O.D. Mount Hope Free Wheeling Expander for handling narrow widths of cloth, plastic film, foil and paper will be on display. Another Mount Hope product developed in the last year is the Selvage Eliminator for eliminating slack selvages and wrinkles before cloth enters the Shearing Machine blades.

In attendance: J. D. Robertson, President; John D. Robertson, Jr., Factory Representative; Walter P. Murray, Sales Engineer; R. E. Blackmar, Ingalls Engineering Co., Rep. for Mass., R. I. and Conn.; P. J. Murdock, Jr., Parkman A. Collins Co., Rep. for Me.; John H. Andresen and H. Hartley, John H. Andresen, Inc., Rep. for Southern N. Y., N. J. and Pa.; S. S. Wilson, Mid-West Rep.; A. B. Julin, Rep. for Northern and Western N. Y.; E. F. Slaughter and J. Fred Slaughter, Slaughter Mach. Co., Southern Reps.; N. F. Batchelder, K. G. Little and E. W. Schmiedel, W. J. Westaway Co., Ltd., Canadian Reps., and A. M. Romero, Std. Mill Supply Co., Rep. for Latin America.

National Drying Machinery Company

Philadelphia 33, Pa.
Booths 33 & 34

Models of the various machinery which the company manufactures will be displayed such as Piece Goods Dryers, Tenter Dryers, Nylon Heat Setting Machines, Cake Dryers, Print Goods Dryers and Yarn Dryers.

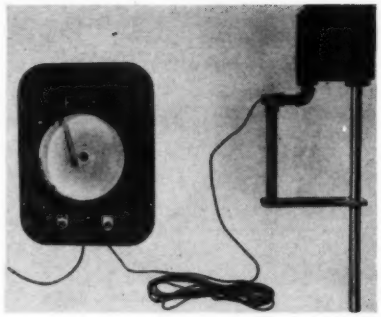
In attendance: Ralph C. Parkes, President & General Mgr.; David A. Colker, Sales Manager; Norman Kern, Jr., Plant Manager; A. M. Zeller, H. O. Kaufmann, J. J. Nihill, F. W. Warrington and George W. Dudley, Jr., Salesman.

John P. Nissen, Jr., Co.

Glenside, Pa.
Booth 710

Nissen will exhibit Writing Tubes and Inks for marking textiles.

In attendance: Milton A. High and Chandler Ford.



Norcross Viscometer

Norcross Corporation

247 Newtonville Avenue, Newton 58, Mass.
Booth 400

Norcross will exhibit the following: Norcross Recording Viscometer for automatic control of viscosity; the Norcross Regulator—specially designed for use on slasher squeeze rolls and insurance for proper roll alignment and roll pressures necessary for best size content and penetration; and information relative to their Automatic Viscosity Control System by Mechanical Agitation. The system is particularly suitable for controlling the viscosity of sizing solutions used in cotton slashing operations.

In attendance: Austin S. Norcross, President; Ralph E. Howell, Southern Branch Manager; Frederick J. Eimert, Northern Office; and Leonard DiIoia, Field Engineer.

Oakite Products, Inc.

22 Thames St., New York 6, N. Y.
Booth 705

Oakite will display a line of specialized cleaning and related products for the textile industry. Featured in the exhibit will be cost-cutting materials designed for cleaning machines, for slime removal and treatment of water in mill humidifying systems, and for safe removal of rust. New developments in paint-stripping materials will also be shown, as well as materials for cutting costs in the cleaning of large equipment and machinery with the Oakite Steam Detergent Gun.

In attendance: J. J. Basch, Philadelphia Division Manager; and main office chemists, engineers, and textile specialists from the company's field service organization.

B. F. Perkins & Sons, Inc.

Chicopee St., Willimanset, Mass.
Booths 130-133

Calender rolls, plastic rolls, a new type 3-roll rolling calender, a fiber conditioner, a hydraulic unit and the new Perkins seam and slub detector in operation on a calender will be exhibited.

Proctor & Schwartz, Inc.

Philadelphia, Pa.
Booths 503-534

This 3500-square-foot exhibit will represent both the Textile Machinery Division and Dryer Division. The Dryer Division plans to highlight recent development, chiefly through motion pictures among which will be those on machinery for producing Redmanized Shrunk to Fit Knit Goods and on the automatic rug scouring and drying system. The Redmanized process is said to offer knitters positive control of the shrinkage problem as well as a superior hand. The rug scouring and drying system reportedly allows the rug cleaner to thoroughly scour, backsize and dry a rug in minutes. The system is designed to dry rugs flat.

The Vat-Craft Dye Process will be highlighted and explained with animated diagram.

A Proctor automatic preboarding machine for nylon hosiery will be in operation mechanically and an actual demonstration of the "breathing principle" of the Proctor Impact Dryer for Stock is being planned. Other Proctor drying systems to be covered photographically and diagramatically are yarn drying equipment, dryers for piece goods, equipment for curing resin treated fabrics, the over-feed pin tenter and equipment for nylon setting.

In attendance: Harmon B. Riehl, Vice President in charge of the Textile Machinery Division; John H. Senior, Vice President in charge of Sales for the TMD; other members of the Textile Division; Myron T. Fleming, Dryer Division Sales Manager; H. B. Black, W. A. Dickinson, Jr., F. Marshall, B. A. Plesser, W. H. Poole, C. W. Schwartz IV, C. S. Tiers, W. A. Dickinson, Sr., and W. J. Merrigan, Philadelphia Sales Representatives; L. P. Tiers, Chicago Dryer Division Branch Manager; C. W. Schwartz III, Providence Dryer Division Branch Manager; John R. Schenck and Thomas Mahan, Charlotte Dryer Division Branch Managers; John W. Reinhardt, Advertising Manager; and Pierre Blommers, Assistant Advertising Manager.

Reliance Electric & Engineering Company

1068-1088 Ivanhoe Rd., Cleveland, Ohio
Booth 363

Among the products to be shown are integral horsepower electric motors and adjustable-speed drives operating from

A.C. circuits. Special features to be emphasized are a V*S Drive operating a section of a typical textile range which incorporates the Reliance VSC Electronic Control for timed rates of acceleration and deceleration, and the Reliance VSS Unit for tension and speed control between units. Items to be displayed which have been developed in the past year include the Reliance V*S Drive providing adjustable speeds from A.C. circuits. Available in ¾—2 H.P. rating.

In attendance: E. E. Helm, Sales Vice President; K. S. Lord, Philadelphia District Manager; C. D. Herbert, New York District Manager; L. M. Dunning, Boston District Manager; E. G. Orahood, Southeastern Acting Manager; W. H. Behnke and C. E. Robinson, Textile Application Engineers; R. L. Custis, Sales Promotion Department; and K. F. Ertell, Advertising Manager.

Reliance V*S Drive

Republic Steel Corporation

Cleveland 4, Ohio
Booths 708 & 709

Stainless steel will be featured along with available fabricated products.

In attendance: Representatives of the Alloy Division and members of district sales offices; J. H. Fishel and Gene Rowland, Sales Engineers; C. E. Roberts, Asst. Mgr. of Sales; C. W. Ruth, Director of Advertising; Robert Shrake, Philadelphia District Sales, and E. E. Bang, Advertising Division.

Rice Barton Corporation

Worcester 1, Mass.
Booths 45 & 46

A single-color printing machine with an all hydraulic driving mechanism and pressure control system will be exhibited. The machine is designed for use either on the printing of textiles or on vinyl film.

In attendance: R. Donald Rusden, Stephen B. Stafford, and Herman A. Smith.

Riggs & Lombard, Inc.

Lowell, Mass.
Booths 222 & 223

R. & L. will show a laboratory size combination machine, which is primarily a stock dye kettle, but which will also dye skeins, a single top or packages; also photographs of their complete line, including bleaching equipment, cloth carbonizing ranges, cloth washers (batch and continuous), crushers (continuous and semi-continuous), derby dry cleaners, dye beck, fulling mills, infra-red carbonizing bakers, J boxes, piece dye kettles, progressive jigs, pusher mills, reels, rolls, rope soapers, sample dye kettles, soap distribution systems, soaping machines, squeeze roll extractors, stock dye kettles, tenter dryers, top dyeing machines, yarn steamers, stainless steel tanks and stainless steel dye house trucks.

In attendance: H. C. Riggs, President; C. J. Lombard, Vice President; F. C. Ames, Sales Representative; Harold R. Wilcox, Engineer; and J. W. Malloy.

Rudel Machinery Company, Ltd.

614 St. James St. West, Montreal, Que.
Booth 449

Rudel's booth will be devoted to space for contacting customers and principals. This Canadian firm represents several American textile machinery manufacturers in the Dominion.

In attendance: J. E. O'Donnell, Vice President; A. R. Webster and E. F. Potter.

Sarco Company, Inc.

Empire State Bldg., New York 1, N. Y.
Booths 250 & 251

In addition to the Company's line of industrial steam traps, air vents, strainers, temperature regulators, and heating specialties, two other special textile developments will be featured. One is the condensate draining systems for dry cans and other rotating cylinders. The other is temperature control for vat dyes, dyeing machines and similar textile finishing equipment.

In attendance: Albert Milnes, Manager of Industrial Sales; D. Roland, J. L. Thompson and E. Greene, Newark and New York Offices.

C. G. Sargent's Sons Corporation

Graniteville, Mass.
Booths 225 & 226

A stainless steel wool scouring bowl will be exhibited.

In attendance: Hugh Williams, Canadian Rep.; F. E. Wasson, Philadelphia Rep.; W. S. Anderson, Southern Rep.; and F. Stanley Smith, Sales Manager.

Scott Testers, Inc.

101 Blackstone St., Providence, R. I.
Booth 41

Scott will exhibit for the first time the IP-2 "Serigraph" with 15 inch "Tensilgram" Recorder. Another featured machine will be the motor driven single-end yarn and thread tester, X-5, for tensile strength and elongation tests up to 20 lbs. Also exhibited will be the Model J Skein Yarn and Cloth Tester, equipped with the recently developed clamp, Model A5, which will be shown together with the established A1 clamp, fabric tensile test specifications standard. In conjunction with the Model J, the Model W Ball Burst Attachment for knitted fabrics will be displayed.

In attendance: Harold W. Horton and David C. Scott, Jr.

Scott IP-2 "Serigraph" with 15 in. "Tensilgram" Recorder

Seydel-Wooley & Company

748 Rice Street, N. W., Atlanta, Georgia
Booth 820

Booth 820 will serve primarily as a "resting point." The company has made up a miniature model of their Niagara Twist-Setter Yarn Conditioning Machine

which will be on display at the booths of their New England Representative, the Standard Mill Supply Company. They have spaces 51-53, just around the corner from booth 820.

In attendance: Vasser Woolley, President; John Seydel, Vice-President; W. L. Whisnant, District Sales Manager; and A. W. LaGrone, Sales Representative.

Smith Drum & Company

432 West Allegheny Ave., Philadelphia 33, Pa.
Booths 55-67

Smith, Drum plans to exhibit the following equipment: skein dyeing equipment for silk, rayon, etc.; skein dyeing equipment for wool and worsted; package dyeing equipment; combination beam and package dyeing equipment; package extracting and drying equipment.

In attendance: Harry S. Drum, William C. Dodson, Albert P. March, Perry M. Parrott, Joe M. Balentine, John P. G. Patton, and Robert N. Smith.

Standard Electronics Research Corporation

2 East End Avenue, New York 21, N. Y.
Booth 271

This exhibit will consist of yarn evenness testing equipment developed and manufactured by the Corporation. The equipment utilizes photoelectric principles and does not touch the yarn during measurement. Equipment will include the SERC Yarn Checker and the SERC Electron Micrometer which comes in several models.

In attendance: Dr. Frederic Fua, President & Director of Research; Francis D. Skelley, Sales Manager; and Anthony P. DeMinco, Field Engineer.

Standard Fabricators, Inc.

355 Walton Ave., New York 51, N. Y.
Booth 117CC

New advancements and developments in yarn dyeing, extracting and drying equipment will be featured. Special emphasis will be placed on new synthetic yarn dyeing machines, and samples of all types of work done on these machines will be shown.

In attendance: E. A. Stienen, President; C. Carnoy, Vice President; G. T. Kreis, Sales Manager; R. G. Stevens and G. Haag, Technicians.

Synthane Corporation

Oaks, Pennsylvania
Booth 8

Synthane plans to exhibit laminated plastic products in the basic forms of sheets, rods and tubes, as well as parts fabricated from their materials made to customers' designs and specifications. A line of the Corporation's molded laminated and molded macerated plastics will likewise be shown, though the exhibit will emphasize the use of laminated plastics in the textile industry. Emphasis will be placed on the combination of properties of Synthane's materials and how this combination can best serve the textile industry. These include lightness in weight, density, dimensional stability, low moisture absorption, corrosion resistance and a favorable weight-strength ratio.

In attendance: R. R. Titus, President; E. E. Smith, Assistant Sales Manager; J. K. Johnson, Philadelphia District Manager; R. B. Galloway, F. C. Nave, and H. Widdop, Sales Managers; G. A. Ebelhare, Superintendent; and C. B. Moss, Southern District Manager.

Taylor Instrument Companies

95 Ames Street, Rochester 1, N. Y.
Booths 551-553

This exhibit will feature:

(1) A reading size viscosity recorder with chart 0-100 centipoise. Operates on either size box, storage kettles or size loop.

(2) A modern control system for wool scouring.

(3) A dye kettle controller with adjustable rate of rise, hold time and hold temperature. There are no cams to cut.

(4) A control panel for package or beam dyeing said to assure greater dyeing uniformity, closer matching of shades, thoroughness of dyeing, and steam and labor savings.

(5) Automatic cotton slashing control system.

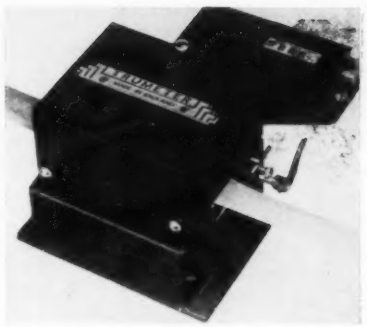
(6) Demonstration unit of Taylor "Transaire"—a new temperature or pressure transmitter.

In attendance: H. G. Olsen, Textile Sales Mgr.; F. S. Ward, Industrial Sales Mgr.; J. S. Detwiler, Divisional Sales Mgr.; J. Barber, Application Engineer; J. E. Hart and K. W. Kugler, Boston Office.

Trumeter Company

1265 Broadway, New York 1, N. Y.
Booth 612

A special feature of the Trumeter exhibit is the new "Trumeter" Ribbon and Tape Measuring Machine, a smaller edition of the manufacturer's Cloth Measuring Apparatus. This new apparatus can be equipped with a ticket printer counting device similar to the large "Trumeter" Measuring Apparatus used in mills for whole pieces—a demonstration model of which will be on view in conjunction with the Inspecting Machine, a product of Henry Livesey, Ltd., England, of which Trumeter is sole representative.



"Trumeter" Ribbon & Tape Measuring Machine

The full range of Trumeter products will be exhibited including the Predetermined Counter, which can set to any desired number within its range. Trumeter will also exhibit the Piece End Sewing Machine by Wm. Birch (Engineers) Ltd., England.

U. S. Gutta Percha Paint Company

Providence, R. I.
Booth 262

An electric motion display will feature the Barreled Sunlight Paint Products for textile plant maintenance. There will also be a special demonstration of the Company's new Barreled Sunlight Acid and Alkali Resistant Coating.

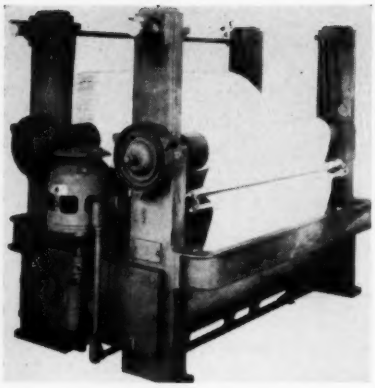
In attendance: Howard F. Eastwood, Asst. Sales Manager, Providence, R. I.; Alex S. West, General Sales Agent, Providence; C. Leon Park, Southern District Manager, Atlanta, Ga.

Van Vlaanderen Machine Company

370 Straight St., Paterson, N. J.
Booths 559-562

Against a background of illuminated photo-murals showing an interior view of the Van Vlaanderen factory and more than twenty examples from the complete line of V.V. processing equipment, several new machines will be displayed including (for the first time) the 15 Ton Padder, a larger, sturdier machine featuring 19½" rolls, pneumatic pressure control, one panel operation, and use of stainless steel throughout.

Two V.V. jigs—the new C.T., a machine having better tension control, drag-free idling, easier and cleaner operation and handling larger cloth rolls, and the



Van Vlaanderen Tensionless Dye Jig

Tensionless Jig will be seen in operation. Also on display will be the V.V. Heavy Duty Tenter frame head.

In attendance: C. H. Van Vlaanderen, President; George Van Vlaanderen, Vice President; Cornelius Van Vlaanderen, Treasurer; A. Barber and G. Ricca, Sales Engineers.

Venango Engineering Co., Inc.

G and Lycoming Streets, Philadelphia 24, Pa.
Booths 16AA & 16BB

Venango will display their line of dyeing equipment.

In attendance: C. Harry McCandless, Sales Manager; A. Robertson; Edwin Slaughter; Fred Slaughter; Hugh Williams and Joseph Cunliffe, Canadian Representatives.

Walton Laboratories, Inc.

1186 Grove St., Irvington, N. J.
Booths 266-268

Walton will have in operation all their humidifiers that have been used for "spot," "booster" or complete humidification, including the new "Model 30." The newest and largest of the Walton equipment is said to evaporate about three gallons of water per hour into the air.

Walton "Model 30" Humidifier

Walton field engineers will be on hand to demonstrate. The company will also exhibit their office and residential line as well as humidity indicators and control equipment.

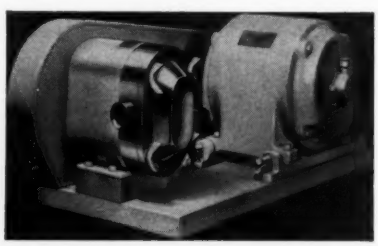
In attendance: William Feldermann, President; John B. Feldermann, Advertising Manager; J. R. Lewis, Sales Manager; Ben Dickinson and Charles Bourgeois, Sales Representatives.

Waukesha Foundry Company

Waukesha, Wisc.
Booths 572 & 573

Waukesha will exhibit the Waukesha Positive Displacement Ball Bearing Pump in the V-belt type unit. Also on display will be a working model of the pump as well as a cut-away model. Rough, semi-finished and polished castings in "Waukesha Metal" nickel alloy, stainless steel, aluminum, bronze and brass constructions will be exhibited.

In attendance: Emil M. Howe, Sales Manager; Richard R. Watt, Eastern Sales Representative; Clyde Monda and Charles E. Schick, Salesmen.



Waukesha Positive Displacement Ball Bearing Pump. V-Belt Type

Werner Machine Company, Inc.

183 Autumn Street, Passaic, N. J.
Booths 120, 120AA, 120BB, 120CC, 121, 121AA

Werner will exhibit their latest type stainless steel jig enclosure as well as jigs and padders in general (the company manufactures a general line of dyeing, finishing and printing equipment). Equipment for a new patented system of jig dyeing will be displayed using a pair of suction tubes submerged in the jig tub with a stainless steel circulating pump to draw the dye liquor through the fabric in both directions into the tubes and back into the jig tub. The process is said to be advantageous in the jig dyeing of acetates, rayons and other synthetics and can be used for scouring and other applications.

Werner Stainless Steel Jig Enclosure

In attendance: Werner P. Rose, President; Alfred R. Gessinger, Partner P. R. Sales Co., Distributors for Werner Mach. Co.

Winsor & Jerauld

1268 Eddy Street, Providence, R. I.
Booths 289-291

W. & J. will exhibit an operating high speed tenter installation including the new #12 Roller Type Chain, precision electronic control tenter guiders, and Improved Reflected Light Type Weft Straightener. Other new developments will be announced.

In attendance: Thomas C. Roberts, Vice President & General Manager; Edmond J. Schiller, Jr., Technical Director; Cecil C. Keyworth, Sales & Chain Engineer.

In addition, the following will also exhibit:

COMPANY	BOOTH(S)
Abbot Machine Company	485-502
Acrometal Products, Inc.	350
Allen Company	244-247
The Allentown Bobbin Works, Inc.	719
Allis-Chalmers Manufacturing Company	127AA-127BB
Aluminum Company of America	1-3
American Lava Corporation	21
American Paper Tube Company	256-257
American Wool & Cotton Reporter	270-270A
Ashworth Brothers, Inc.	108-110
Ateliers Roannais de Constructions Textiles	100-102
Atkinson Haserick & Company	702&703
Bachmann Uxbridge Worsted Corp.	19
W. H. Bagshaw Company	80&81
The Bahnson Company	11-18
Barber-Coleman Company	377-396, 382AA-386AA, 105-107
Bijur Lubricating Corporation	263
William Birch, Ltd.	612
Benjamin Booth Company	347&348
The Brush Development Co.	718
The Bunting Brass & Bronze Co.	69&70
A. B. Carter, Inc.	38
Century Electric Co.	617
Chandler Machine Company	20
Chapman Electric Neutralizer Co.	712
The Cleveland Graphite Bronze Co.	364
Clinton Foods, Inc.	54
Cocker Machine & Foundry Co.	535AA-535-537, 548-550, 550AA
Container Corporation of America	557&558
Continental Diamond Fibre Co.	271AA
William Crabb & Co.	339AA
Crompton & Knowles Loom Works	323-338
Cutler-Hammer, Inc.	126AA-126BB
Davis & Furber Machine Co.	467-484, 463-464
Davison Publishing Co.	368&369
Dixon Lubricating Saddle Co.	258
Draper Corporation	232-243, 237AA-238AA, 232AA-243AA
Durant Manufacturing Co.	261-261AA

COMPANY	BOOTH(S)
Edda International Corp.	807
Elastic Stop Nut Corporation of America	224
Eriez Manufacturing Co.	568-570
The Fafnir Bearing Co.	252&253
Fairchild Publications	351
The Felters Company	39
Fibre & Fabric	812
The Formica Company	357
Foster Machine Company	425-432
The Fuller Brush Co.	704
Graton & Knight Company	349AA-349BB
Grinnell Company, Inc.	115-117
H & B American Machine Company	144-158
Joseph J. Harney	811
George S. Harwood & Son	468-484, 463&464
Hayes Industries, Inc.	586
Hayssen Mfg. Co.	88&89
Herr Manufacturing Co., Inc.	84&85
Holdsworth Gill Screw Co., Inc.	702&703
R. H. Hood Company	315-320
Howard Brothers Manufacturing Co.	339&340
Hubbard Spool Company	587
Philip V. Hugues & Sons	47&48
Hunt Machine Works, Inc.	31&32
Hyatt Bearings Divn. General Motors Corp.	292&293
Industrial Tape Company	26
Invincible Vacuum Cleaner Mfg. Co.	47&48
The Kent Company	47&48
Lamberth Rope Corporation	346
F. A. Lazenby & Co.	248&249
Thomas Leyland Machinery Co., Inc.	45AA
Lestershire Spool & Mfg. Co.	713
Lincoln Engineering Company	588
Link Belt Company	90-94
H. F. Livermore Corp.	111&112
Livingston Engineering Co.	364BB
Lockwood Greene Engineers, Inc.	79
C. W. Logeman Co.	45BB
McGlynn-Hays Industries	156AA-157AA
Machinecraft, Inc.	618
The Marquette Metal Products Co.	144AA-144BB
Micro-Lite Co., Inc.	616
A. Milne & Company	571
Milton Machine Works	344
Morse Chain Co.	555&556
Muschamp Taylor, Ltd.	401-404
J. M. Nash Company	614&615
New Departure Divn. General Motors Corp.	117AA-117BB
New York & New Jersey Lubricant Co.	42
Optical Associates	707
P.O.M. Company	585
Panamerican Publishing Co.	372&373
Parks-Cramer Co.	138-143
Penick & Ford, Ltd., Inc.	590
Platt Bros. (Sales) Ltd.	714-717, 716AA-717AA
Pneumafil Corporation	68AA-68BB
Progressive Machine Co., Inc.	554
Rayon & Synthetic Textiles	272
Reeves Pulley Co., Inc.	313&314, 321&322
Robert Reiner, Inc.	73-78
J. E. Rhoads & Sons	352-352AA
Joh. Jacob Rieter & Co., Ltd.	309-312
B. S. Roy & Son Co.	344AA
S. A. Officina Meccanica	802-804
S K F Industries, Inc.	465&466
Saco-Lowell Shops	405-424
Saentis, Inc.	706
George Scherr Company	609
Schmidt Manufacturing Company	269
Shell Oil Company, Inc.	356AA-356BB
Singer Sewing Machine Co.	259&260-260AA
James Smith & Son, Inc.	316-319
Societe Anonyme Adolphe Saurer	706
Sonoco Products Company	71&72
Standard Mill Supply Company	51-53
Standard Pressed Steel Company	605
Steel Heddle Manufacturing Company	365-367&365AA, 374-376&376AA
Stellite American Corp.	817-819
Sterling Engineering & Manufacturing Co.,	364AA
Stewart-Warner Corporation	355&356
Sykes, Inc.	358
The Takk Corporation	589
G. H. Tenant Company	273&274
The Terrell Machine Company	277-287
The Texas Company	345
Textile Age	450
Textile Bulletin	275
Textile Industries	353-353AA
Textile World	357AA-357BB
Ton-Tex Corporation	43&44
Tweedales & Smalley, Ltd.	714-717, 716AA-717AA
U. S. Bobbin & Shuttle Company	348AA
U. S. Dept. of Commerce	117DD
U. S. Hoffman Machinery Corp.	611
U. S. Textile Machine Company	124-129
Universal Winding Company	165-179, 276&288
Uster Corporation	68AA-68BB
Veeder-Root, Inc.	264&265
Victor Ring Traveler Company	254&255
Walker Manufacturing Co., Inc.	82&83
The Warner & Swasey Company	294-308
Watson & Desmond	579-581
Watson-Williams Mfg. Company	582-584
Werner Textile Consultants	585
Westinghouse Electric Corporation	95-99, 95A-95B-95C
Westport Fibre Corp.	830&831
Whitin Machine Works	180-199, 180AA-189AA-190AA, 199AA-24&25
Wiltex, Inc.	610
Woonsocket Napping Machinery Co.,	118-118AA, 119-119AA, 122&123
York Corporation	360-360AA, 361-361AA

• PATENT DIGEST •

PAUL WENGRAF

Creaseproofing Textiles, Excess of Resins Removed by Hydrophilic Substances G, 2, 04

U. S. Pat. 2,493,381
(U. S. Finishing Co., Balassa, Jan. 3, 1950)

Fabrics creaseproofed by resin impregnation frequently have the drawback of showing a harsh handle, i.e., poor draping properties and a decrease of tensile strength and wear resistance. The present invention assumes that crease resistant qualities depend merely on the amount of resin penetrating thoroughly into the fibers, while excess of resin particles adhering to the surface is responsible for the disadvantages mentioned above. Accordingly, former attempts were directed to retard resin formation in textile finishing processes by using "latent" (i.e., slow acting) catalysts. This delayed action was observed to help somewhat, but not completely, in avoiding superficial agglomeration of resin particles on the surface. In contrast thereto, the present method does not contemplate elimination of formation of the resins on the surface but removal of the excess by an aftertreatment with a hydrophilic substance, preferably China Clay. (Applying other materials such as talc, pumice, etc., is possible but not as efficient as clay). The fabric is treated (for instance, with a resin solution in water dispersible form such as a 50% creamy methylolurea dispersion), then rolled up to avoid air drying; after 15 minutes the roll is opened and covered with a mixture of 950 p.b.w. China Clay and 50 p.b.w. glacial acetic acid, the latter acting as a catalyst. This slurry is vigorously brushed and shaken to remove loose adhering particles, after which the fabric is cured and dried. The crease resistance was measured according to the Amick method, described in REPORTER 1935, 553, 645 and 662, and found to be 86%. This dropped, after several launderings, to 84%. It is within the scope of the invention to apply, in the first step, a resin plus a latent catalyst and in the second step, the hydrophilic material without adding a catalyst. All kind of thermosetting resins can be used.

References cited by the Patent Office, among others:

U. S. Pat. 2,235,141/1941 (Celanese): creaseproofing acetate of cellulose by padding with neutral formaldehyde-urea solutions, curing in an acid gas atmosphere.

U. S. Pat. 2,224,293/1940 (Celanese): use of dispersions of formaldehyde-urea in Turkey Red Oil. The colloidal solutions obtained in this way are used without any catalyst for creaseproofing cellulose esters only.

U. S. Pat. 2,219,375/1950 (Rohm & Haas): use of non-condensed mixtures of urea and formaldehyde plus acid for creaseproofing. Curing is performed in a subsequent process.

U. S. Pat. 2,196,256/1940 (Celanese): impregnating fabrics with a formaldehyde-urea precondensate, drying, breaking the coherent coating of precondensate and brushing the disintegrated material; the last step consists of curing the resin.

Note

The figures which appear on the following page should have been run in conjunction with U. S. Pat. 2,492,574 "Drying Apparatus for Fabrics in Rope Form" which appeared on pgs. 267-268 of the April 17, 1950 issue (Volume 39, No. 8).

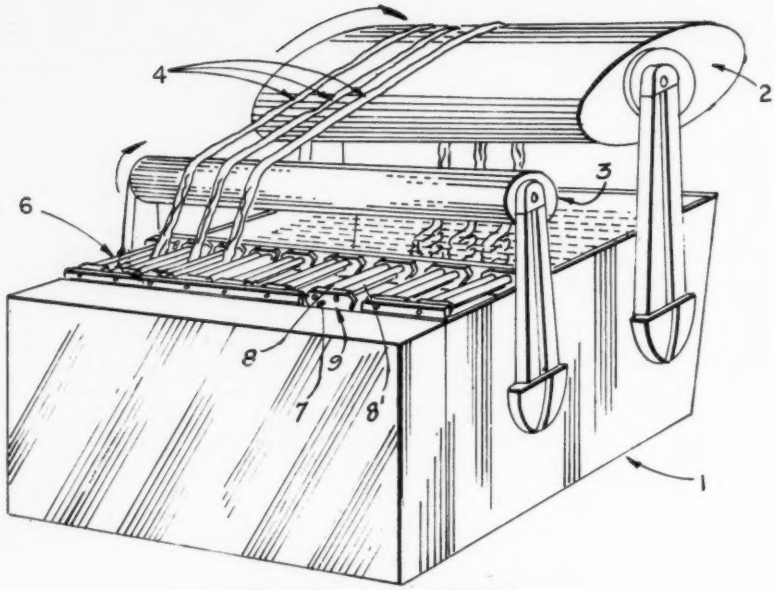


Figure 1—U. S. P. 2,492,574

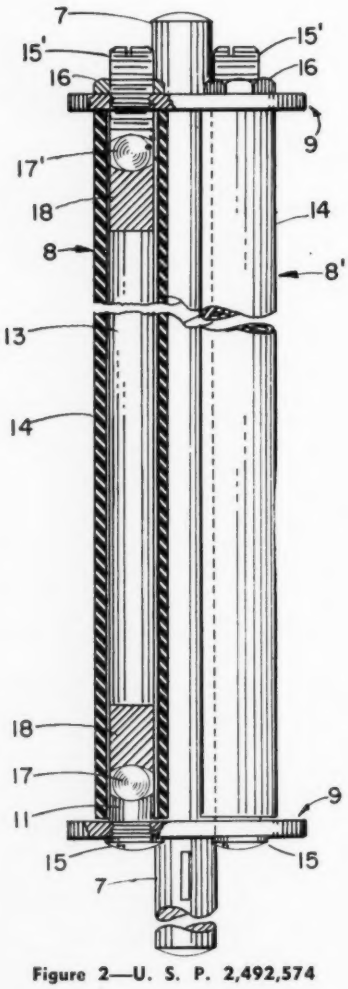


Figure 2—U. S. P. 2,492,574

Shrinkproofing Wool, Concentrated Amines A, 2, 04

U. S. Pat. 2,493,765
(Le Compte, Jan. 10, 1950)

The invention aims at reducing the shrinking properties of wool and, at the same time, imparting resistance to damage by natural organisms. Anhydrous amines or solutions thereof in concentrations of 50-75% or more are used. This treatment may produce modified fibers to such an extent as to become soluble in cold water. Morpholine, diethanolamine or triethanolamine are preferably applied, but other amines such as monoethanolamine, diethylene triamine, etc., optionally condensed with dibasic acids (sebacic or azelaic acids) may be used as well. The anhydrous condition mentioned above results from impregnating with less concentrated solutions, drying and thereupon baking the fabrics at temperatures up to 160°C., which is said to be the maximum by reason of the sensitivity of the fiber to higher temperatures. Thus, wool is soaked in a 10-12% aqueous solution of diethanolamine, the excess liquid drained off and the goods baked at 150°C. for 30 minutes. Other examples call for treating wool with anhydrous triethanolamine and heating at 90°C. for 5-10 min. or for heating the goods with anhydrous morpholine at the same temperature for 30 min. Complete shrink-proofness is claimed. No example is given for producing cold-water soluble modifications of the fiber as mentioned in the specification's preamble.

References cited by the Patent Office, among others:

U. S. Pat. 2,382,632 (Ellis Foster): prevention of felting of wool with primary or secondary amines, or quaternary ammonium compounds, or alkaline salts of amino acids by heating to 50-90°C. for 15-60 min.

U. S. Pat. 2,257,088/1941 (Rohm & Haas): use of condensates of high molecular aliphatic chains, substituted phenols, formaldehyde and secondary amines for water repellent effects.

U. S. Pat. 2,250,930 (Imperial Chemical Industries): application of stearamidomethyl pyridinium chloride (thus "Velan") in aqueous solutions to predyed silk or wool to make the fibers water repellent. Reference is further made to the shrinkproofing methods patented by Tootal, Broadhurst, Lee Co.) cf. Brit. P. 592,880, REPORTER 1948, 697) comprising treatment of wool with strong alkalis, dissolved in alcohol.

Steaming Apparatus for Pretreating Raw Textiles A, 7, 02

U. S. Pat. 2,494,731
(Mathieson Chemical Co., Vincent-Dubeau, Jan. 17, 1950)

This specification refers to the same inventors' U. S. Pat, 2,395,303/1946, which describes a steaming apparatus for pretreating fabrics in full width in a closed steam chamber in a continuous operation, forming "accordion" folds and thus avoiding creases which are known to be visible in the finished fabrics after treatments in rope form. The apparatus protected by the older patent comprises a steam chamber enclosing one single conveyor of considerable length. An improved form permitting economy in material, floor space and steam has been developed according to the present patent.

A plurality of lateral conveyors are placed above one another (See Fig. 1). The fabric (16) is introduced into the steam chamber (10) through the slot (17); it passes downward over the beater roll (21) falling from here in folds (16 a) onto the inclined member (22). The beater roll (21) is composed of cross arms supporting cross rods (25 and 26) spaced at different distances from the shaft (23) so that the cloth is forced to wave back and forth by the rotation of the beater. The angle of inclination of member (22) is greater than 45°, preferably about 55°. It can be seen that the folds are first dropped on the top of the conveyor (13), then carried to another similarly inclined member (35) discharging the folds onto the center conveyor (14); from here the fabric is led the same way to (15) and finally withdrawn from the steam chamber through (37).

References cited by the Patent Office, among others:

U. S. Pat. 2,134,160/1938 (Kohorn): a cutting device for staple fibers, compris-

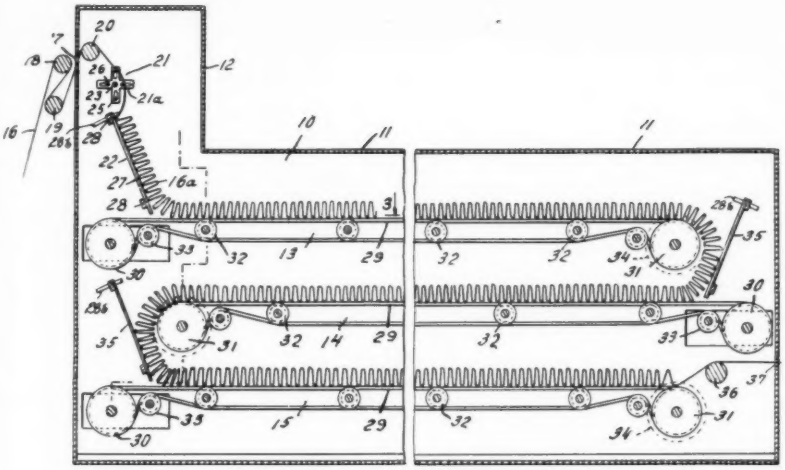


Figure 1—U. S. P. 2,494,731

ing continuous spinning and cutting while the fibers are still wet, thereby permitting better shrinking and twisting than in dry state.

U. S. Pat. 2,036,693/ 1936 (Van Vlaanderen Machinery Co.): a drying machine for textile fabrics, used especially for boiling off goods and consisting of two conveyor chains which form undulations in the fabrics and force it to enter in undulated form through the the boil-off liquid.

U. S. Pat. 1,975,036/1934 (Dulken): a device for steaming and moistening yarns in one apparatus in immediate succession. These treatments are carried out in a close chamber, with each one independent.

Apparatus for Automatically Stopping Textile Machines G, 3

U. S. Pat. 2,497,017
(Pacific Mills, Shann, Feb. 7, 1950)

This invention relates to continuous operations in processing textile fabrics in the open width. The device can probably be used for finishing operations, calendering, delivering fabrics to tenter frames and for dyeing. The principal object is to stop the rolls when "laps" begin to form and to deliver absolutely equal amounts of material from one pair of transporting rolls to the next one. The device is placed, according to Fig. 1, between pairs of rolls (14, 15 and 16, 17). Between these two points the fabric passes a pivoted trough (12), oscillating around bearings (13). A metal plate (26), supported by springs (9) and (10), can be adjusted by screws so that the bottom of trough (12) is held in a position just above the roll (16). Roll (15) is driven by a motor and (16), is driven directly from (15) so that a stoppage of (15) at the same time causes stoppage of all the other rolls. Two switches (19) and (20) are provided near the outlet end of the trough. They act in inverse ways: one of them (19) closes a contact by pressing down the bottom of the switch when the weight of the fabric accumulated on the trough is greater than normal. The other switch (20) is closed by the motion of a spring located inside of the switch when the weight is less than normal. By closing the switches an electric current acts in both events on a relay, stopping the movement of the rolls. Since the trough (12) is well balanced in the initial position and readily movable, any difference of weight caused by irregular delivery such as deficiency or excess of material, lapping around one of the rolls, or the like, will result in immediately stoppage of the device.

No references have been cited by the Patent Office.

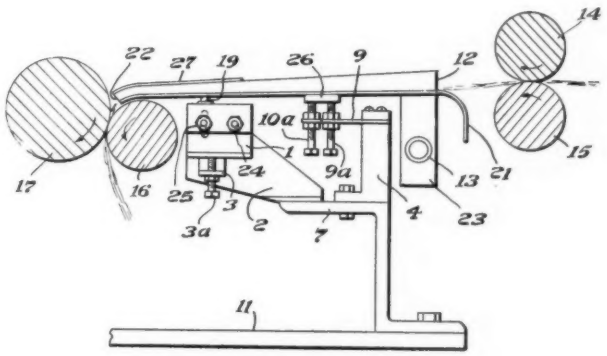


Figure 1—U. S. P. 2,497,017

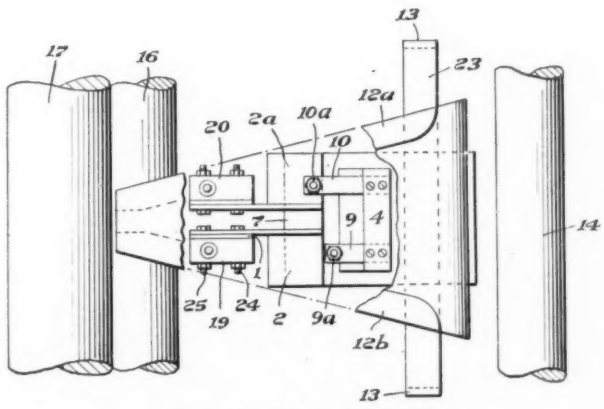


Figure 2—U. S. P. 2,497,017

Dyeing Cellulose Acetate with Solvent Solutions of Dyes, Alkalies Added C, 4, 07

U .S. Pat. 2,495,810
(Celanese Corporation of America, Hindle, Jan. 31, 1950)

Cellulose ester fabrics are easily dyed with solvent solutions optionally blended with swelling agents (cf. among others Brit. P. 596,264, REPORTER 1948, 702; and U. S. Pat. 2,428,833-36, REPORTER 1948, 397). When dyed according to this method certain dyes have been observed to exhibit a tendency to fade when exposed to an acid atmosphere. The present patent discloses that a substantial improvement can be attained in this respect by adding small amounts of alkali (1-4 gms. per liter) e.g., NaOH or KOH, to the alcoholic solvent dyebath. The alkali not only increases the resistance to acid fad-

ing but yields heavier dyeings at the same time. The lower alcohols used in this process are ethanol, methanol, isopropanol or the like. Furthermore, swelling agents (for instance, sodium thiocyanate) may be added in an amount of 1-3% calculated on the weight of the dyeing bath. In an example, 2000 gms. sodium thiocyanate, 300 gms. NaOH and 500 gms. Cellitone Blue AF are dissolved in a mixture of 75 liters ethanol plus 25 liters water. A cellulose fabric is padded in this solution, washed and dried. The fabric is said to exhibit great resistance to acid fumes.

References cited by the Patent Office, among others:

U. S. Pat. 2,428,835/1947 (Celanese)—see above—a suggestion to dye acetate of cellulose with an acid dye dissolved in 60% of a lower alcohol + 1-3% of a thiocyanate.

U. S. Pat. 2,017,119/1935 (Celanese): improvement in dyeing cellulose acetate by an aftertreatment with aralkylamino bases, e.g., dibenzylamine.

U. S. Pat. 1,955,796 (Celanese, Ellis): addition of p-di-hydroxy compounds (for instance, hydroquinones) as printing aids for discharges.

Other reference:

U. S. Pat. 2,049,431 (Dreyfus): pretreatment of cellulose acetate with alkaline earth hydroxides in presence of alcohols.

A mild saponifying effect, obtained in the present method by combining the solvent dyeing process with relatively small amounts of alkalis, can be assumed.

ABSTRACTS

The Structure of Textile Fibers. XI—Fibers Made from Dispersed Proteins

R. L. Wormell, J. Textile Institute 40, P16-28, Jan., 1950.

There are certain important features of protein structure.

1. Nearly all known amino acids occur in nearly all proteins.
2. The mean molecular weight of the amino acid residues is much the same in all proteins, lying between 110 and 120. Since the molecular weight of the atoms in the backbone or chain CO.CH-NH is 56, one-half the molecular weight of a protein is in its chains and one-half in the side groups.
3. All fibrous proteins show hydrogen bonding between nitrogen and oxygen atoms.

From the point of view of making fibers from dispersed proteins three types of active side group are important; these are the carboxyl, the amino, and the amide.

The carboxyl group is important because it enables the protein molecules to "fly off" and become dispersed in dilute alkali. It also allows cross linkage of the molecular chains by metals having more than one valency (e.g., aluminum or chromium). This cross linkage is described in detail.

The amino group may also be used to "give wings" to the protein, and allows it to be dispersed in acetic acid. However, it is chiefly important because it is responsible for the hardening or curing of protein fibers by means of formaldehyde. This reaction is explained.

The amide group also reacts with formaldehyde, giving a more stable cross-link than that produced by the amino group. This principle is utilized in the manufacture of fibers from zein, whose protein has a high proportion of amide groups.

The author also comments on the influence of the molecular size of proteins on the structure of fibers made from them. W.H.C.

Relative Humidity and Rayon

E. Cotterill, J. Textile Institute 40, P9-15, Jan., 1950.

The author lists various reasons why controlled humidity is desirable in processing of rayons, as follows:

1. To help machinery to behave uniformly.
2. To help yarns to react uniformly to the stresses and strains of the various processes; this applies particularly to the regenerated celluloses, viscose and cuprammonium.
3. To control static electricity generated on the yarn, particularly acetate.
4. To improve the flexibility of the yarn, particularly in twisting processes.

Increase in the moisture content of a rayon yarn is in all cases accompanied by swelling and brings about a loss of tensile strength and a reduced elasticity in the sense of recovery from a given load. This is presumed to be due to the reduction of the internal cohesion through separation of the cellulose molecules by water molecules. A table of the water inbibition values for six man-made and three natural fibers is given.

The author presents graphs showing the moisture regain of viscose and acetate rayon at various relative humidities, the effect of r. h. on the stress/strain relations, etc., and concludes with a number of recommendations for optimum relative humidity and temperature values in the various stages of processing these yarns, both filament and staple, having regard for such factors as static control, strength of the fibers, and the health of the operatives.—W.H.C.

Some Aspects of Printing Thickenings (Especially Starch Thickenings)

J. Zonnenberg, J. Soc. Dyers Colourists 66, 132-40, Feb., 1950.

"The functions of a thickening agent are very important and various, the quality of the resulting print depending largely upon the thickening agent. The depth, the brightness of the colors, and especially the sharpness and smoothness of the print are influenced or even determined by it. The different thickening agents show considerable variation as to their suitability for the various applications, and the non-availability of a certain thickening agent may prevent a certain pattern or article from being printed at all."

The paper deals mainly with the application and technical examination of thickening agents based on starch. It first summarizes modern ideas on the structure and properties of starch and its components, amylose and amylopectin. It describes the gelatinizing action that takes place when a suspension of starch in water is heated. It gives much detail on the advantages and disadvantages of starch and its various modifications (soluble starch, dextrine, starch ethers, etc.) in textile printing pastes. There is also a discussion of the stability of thickenings; the effect of mechanical stirring; and the influence of one type of thickening on another in mixtures, accompanied by graphs. Wheat starch is stated to give greater color value, particularly with vat dyes, than any other

thickening, and the author offers an explanation. He concludes as follows:

"In our opinion the immediate object of further study should be to simplify and improve the selection and number of thickeners in use. This in the long run may lead to standardization, and therefore to better control, which will be in the interest of every textile print works.—W.H.C.

The Dyeing of Direct Cotton Dyes on Fibro Carpet Yarns in Hard Water

M. V. Campbell, J. Soc. Dyers & Colourists 66, 120-32, Feb., 1950.

The range of direct cotton dyes available for use in hard water is considerably restricted by the following factors—(a) many direct dyes are insoluble in or precipitated by such water at the boil, and irrespective of the sodium chloride concentration give little or no dyeing; and (b) others are so sensitive to the large amounts of electrolytes present that in the absence of added sodium chloride they give a heavy "strike".

Many of the Class B (S.D.C. classification) dyes become Class C dyes when used in hard water, but they can be restored to Class B by the addition to the dyebath of small amounts of Calgon T.

Chlorantine Fast Brown BRLL represents a reference type for the dyes in (a) which are redissolved by additions of Calgon T to the dyebath; while Chlorantine Fast Blue GLL 200 is a reference type for the dyes (b), in the dyeing of which an addition of 0.5 g. of Calgon T per liter acts as a restraining influence and reduces the "strike". Waters of 5° English hardness or more respond to the restraining influence exerted by Calgon T.

Other similar agents and their properties in dyeing direct dyes in hard water are discussed, and a table is included showing the solubility of various direct dyes in hard water with and without the addition of Calgon.—W.H.C.

Warp Dyeing

G. S. Marr, J. Soc. Dyers & Colourists 66, 108-20, Feb., 1950.

This is an extensive and very complete description of warp dyeing, both in the open box and in the beam dyeing machine, with particular emphasis on mechanical details. It includes a discussion of the construction of the warp and the form in which it is usually delivered to the dyer; diagrams of the machinery employed, including both dyeing and drying equipment; and the uses of colored warps for a large variety of fabric constructions; with brief reference to showerproofing and rubberizing treatments. It concludes with comments on the colorfastness to be expected in a dyed warp.—W.H.C.

The Scouring of Wool with Synthetic Detergents

J. A. Hepworth, J. Soc. Dyers & Colourists 66, 101-8, Feb., 1950.

Since the introduction of synthetic detergents the possibility of their use for scouring raw wool has been of interest. During the past two years the price of soap has increased markedly, so that it is now more expensive than the synthetics.

Before going into the question of scouring raw wool, it is of interest to consider the types of synthetic detergent available. At present there are three main types: (a) secondary alkyl sulphates, e.g. Teepol type; (b) alkarylsulphonates, e.g. Santomerse type; (c) alkylphenolethylene oxide condensates, e.g. Lissapol N type; the first two being anionic and the last nonionic. In England (a) and (c) are the most important; in America, (b).

The scouring of raw wool is a very complicated problem of detergency. The types of impurities (wool grease, suint, vegetable matter, dirt, etc.) vary within very wide limits, and the presence of lime causes further difficulties.

The essential factors when scouring raw wool with synthetic detergents are:

(a) A correct concentration of electrolyte in the scouring bowls is essential.

(b) For most economical running, the main bowls must have a free soda ash content.

(c) The correct distribution of detergent in the bowls must be maintained.

(d) The rate of feed of soda and detergent should be just sufficient to give a steady increase in concentration during running.

(e) The temperature of the scouring bowls must be kept sufficiently high.

With regard to (a), it is definitely established that an addition of an electrolyte (e.g., salt) to any of the synthetic detergents increases their efficiency in grease removal. The author elaborates on this point, and also discusses the function of soda ash in the scouring bath, and makes definite recommendations for large scale operation.

He concludes with a discussion of effluent treatment, which calls for some modification when synthetics are used, owing to their increased stability.—W.H.C.

Use of Formaldehyde and Derivatives for Stabilized Finishes

"Technologist", Textile Mercury & Argus 122, 231-5, Feb. 10, 1950.

Reference was made in an earlier article to mechanical processes of the Sanforizing and Rigmel types for closing up the warp and filling threads of woven fabrics so that they would show no tendency to contract or extend in subsequent washing. Not all types of fabric respond satisfactorily to this treatment. This has been particularly noticed with cellulose rayon goods. It has become evident that some additional treatment is required to make the rayon threads less "lively" so that the closing-up process may not be upset by dimensional changes produced in subsequent washing by swelling of the fibers on wetting and contraction on drying. A formaldehyde treatment has been found very suitable to produce this stabilization.

The author cites numerous patents in this field, the process consisting of impregnation of the fabric with a solution of formaldehyde and an acid or acid-liberating substance, followed by drying and baking at an elevated temperature. The use of formaldehyde is objectionable because of the vapors liberated during the process.

A more recent modification, introduced by Cluett, Peabody & Co., substitutes Glyoxal, which is a di-aldehyde and has but little odor. It is believed by the inventor that Glyoxal reacts with the cellulose to form an acetal compound. This is disputed by other investigators. The chemistry of "Formalizing", giving the reactions of cellulose with both formaldehyde and Glyoxal, is discussed in considerable detail.—W.H.C.

Water - Impermeable, Water - Vapor-Permeable Coated Fabrics. Development of a Waterproof Coated Fabric Which Transmits Body Perspiration

G. E. Martin, H. S. Sell, and B. W. Habeck, Textile Research J. 20, 123-32, Feb., 1950.

The limitations of rubberized coated fabrics, plastic films, or plastic-coated fabrics for use in rainwear apparel have long been recognized. While such materials afford effective protection from the rain, their very limited ability to transmit body perspiration away from the wearer results in the problem of heat build-up on the inside of the impermeable garment, with resultant sweating and chilling.

In this article a coated fabric is described in which a combination of a solid pigment and a synthetic rubber was used, which is waterproof and simulates uncoated fabric in wearing comfort. This coated fabric has good flexibility, flex-resistance, abrasion-resistance, resistance to aging, and resistance to washing and/or dry-cleaning. Field testing and controlled climatic testing have indicated the usefulness of this coated fabric. Further developments are in progress in the application to tent cloth, footwear, etc. Data are given to show that this type of coated fabric comes very close to uncoated fabric in its ability to transmit moisture vapor.—W.H.C.

(Concluded on Page 316)

IDENTIFYING TEXTILE FIBERS FOR DYEING*

E. A. W. BOYCE, B.Sc., A.T.I., M.C.I.C.

Magog Print Works, Dominion Textile Co. Ltd., Magog, Que.

THE average dyer when engaged in commission work is always worried about positive identification of the fibers contained in the materials he is required to process and generally relies on his own judgment and experience for this identification. A yarn made out of one kind of fiber is quite easy to spot, but difficulty always arises with mixtures of fibers, especially mixtures of synthetic fibers, which usually require the use of a microscope aided by certain chemicals and staining materials.

A complete answer to this question is the subject of a whole evening's paper and in the few minutes at our disposal we can only touch on the main routines in general use today. These we will discuss under five main headings:—

Visual Tests

The observer judges the material by feel, color, luster, softness, etc. and decides whether or not the yarn contains one kind of fiber or is a mixture. Single fiber yarns are also broken down into general groups such as animal, vegetable, filament yarns, staple fiber, bast fibers, metals, rubber and so on.

If bast fibers are suspected a single fiber can be extracted and held with the free end towards the observer. When the fiber is dampened flax and ramie will revolve in a clockwise direction while hemp, Manila, sisal and jute will revolve in a counter-clockwise direction. Other fibers do not revolve.

Burning Tests

These are most effective when single fibers are used and are advanced slowly towards the flame.

Animal Fibers—Wool, silk, hair and fur fibers burn slowly forming a black hard mass, with a burnt hair smell.

Vegetable Fibers—Cotton, bast fibers etc. burn rapidly leaving very little ash, with a burnt paper smell.

Regenerated Celluloses — Viscose and cuprammonium rayons, etc., burn very rapidly leaving no ash with a burnt paper smell.

Acetate Rayon—Burns slowly forming a hard black mass with an acetic acid smell.

Weighted Silk—Burns slowly leaving a complete ash skeleton with a burnt hair smell.

Vinyon—Burns slowly, forming an irregular bead which has the peculiarity of shrinking from the flame with a paraffin smell.

Nylon—Burns slowly forming a hard round bead which also shrinks from the flame, with an amide smell.

Asbestos—Does not burn.

Glass—Melts, but does not burn.

Rubber—Melts and burns with a characteristic smell.

Microscope

A longitudinal section mounted either dry or in distilled water is usually sufficient and comparison is made with standarard fiber photomicrographs, good examples of which can be found in most published works on textile testing or fiber technology.

Chemical Tests

These tests, for the most effective results, should be applied on the microscope slide and the results observed under the lens.

Acetate Rayon — Dissolves completely and rapidly in acetone.

Cellulosic Fiber—All soluble in cuprammonium hydroxide.

Animal Fibers—Soluble in 5 per cent caustic soda.

Vegetable and Regenerated Celluloses—When treated with 5 per cent caustic soda these swell considerably but do not dissolve.

Cellulosic Regenerated Celluloses and Non-lignified Bast Fibers—Those coming from the leaves of the plants are soluble in 80 per cent sulfuric acid, while wool and lignified bast fibers, which come from plant stems, are unaffected.

Kapoc And Fur Fibers—Will float in alcohol while wool and cellulosic fibers sink.

Stains

These should also be applied and observed under the microscope.

Three distinctive staining solutions when properly applied to fibers on a microscope slide will each color different fibers distinctive shades. These are:—

Shirlastain A.

A Mixture of Eky Blue FF Rhodamine B and Bismark Brown RR.

A mixture of Malachite Green and chlorazol Fast Red FS.

Other stains are used for specific purposes such as:—

Methylene Blue which will color mercerized cotton a deeper shade of blue than unmercerized and is often used to check the degree and evenness of the mercerizing process.

A mixture of Fast Red 5BL and Fast Green BLL. Will stain mature cotton fibers a reddish shade and immature cotton a greenish shade, when properly applied. This test is mainly used on raw cotton before it is spun into yarn.

Iodine and Iodine Zinc Chloride solutions are used to differentiate between animal and vegetable fibers.

For very complete information on the use of these stains we would refer to the *"Journal of the Textile Institute"* of March 1948 under the heading of Tentative Textile Specification No. 13, 1948.

These are among the simplest and commonest tests generally used for fiber identification and any dyer having access to a microscope and familiar with their application should have no trouble in positively identifying even the most complex mixtures of fibers.

* Paper presented at a meeting of the Canadian Association of Textile Colourists and Chemists, Quebec Section, on January 21st, 1950, in the series "Question of the Month." Reprinted from Canadian Textile Journal.

Proceedings of the
American Association of Textile Chemists and Colorists

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MAY 1, 1950

AMPLE ACCOMMODATIONS AVAILABLE FOR PORTSMOUTH CONVENTION

THE Committee for the Twenty-Ninth Convention to be held at Portsmouth, New Hampshire, September 28-30, wishes to stress the fact that ample accommodations will be available for all members who wish to attend. In addition to Wentworth-by-the-Sea, Convention Headquarters, the facilities of the following hotels will be available: Marshall House, The Emerson and Cottages, Rockingham, Harrington and Drake. These hotels can accommodate 1400 individuals. In addition, motels, cabins, and tourist homes are available for any excess.

The Committee also announces that there will be two old-fashioned New England clambakes—one on Friday noon and the other Saturday noon.

The Convention is sponsored this year by the Rhode Island Section with the following committee on arrangements:

General Chairman—George H. Wood.
Assistant General Chairman—Raymond Jacoby.
Dining and Banquet—Wilfred A. Lord and Francis H. Casey.
Entertainment—E. Kenneth Bush.
Finance—Robert R. Farwell.
Printing—Frank L. McCool.
Ladies—Robert P. Wood.
Exhibits—Raymond A. Pingree.
Publicity—W. George Parks.
Reservations—Herbert S. Travis.
Registration and Reception—Thorwald Larson.
Technical Program—Alden D. Nute.
Transportation—Herman C. Allen.

Lou Koch Service

Front View, Wentworth-by-the-Sea

THE ANNOUNCEMENT OF THE TECHNICAL PROGRAM FOR THE 1950 CONVENTION WILL BE FOUND ON PAGE P214 OF THE APRIL 3, 1950 ISSUE

General Technical Session—

THE CATALYTIC DEGRADATION AND OXIDATION OF CELLULOSE*

W. GEORGE PARKS, JOHN G. ERHARDT, JR., and DONALD R. ROBERTS

Department of Chemistry, Rhode Island State College, Kingston, R. I.

The catalytic decomposition of cellulosic material and the effect of various possible flame-retardant reagents on the reactions involved were investigated. The rate and mechanism of the oxidation of cellulose were studied on the basis of the products of the reaction in the presence of various catalytic substances. The volume of carbon dioxide, the volume of carbon monoxide, and the quantity and composition of the tarry products formed were determined.

In the experiments completed to determine the influence of various chemical compounds in the oxidation of char, no group of compounds exhibited satisfactory glow-proofing properties. The effect of various catalysts was tested on the formation of tars. The carbonate and chloride of lithium decreased the tar formation. Sodium carbonate and chloride and potassium chloride were also effective.

Afterglow was observed with all catalysts except the borates, phosphates, cerium sulfate and chromic, antimony and zinc chlorides. Phosphate salts are, in general, most effective in reducing the amount of tar and carbon dioxide in the thermal decomposition of cellulose and have a marked effect on flammability.

THE literature contains many references on the important subject of textile-fabric flammability. The research and development work reported has been primarily concerned with new or improved flame-retardant materials and the methods of application to fabrics. Experimental data on the fundamental principles involved in the preparation of flame-retardant materials for application to textile fabrics and the mechanisms by which they function are not available. The absence of sufficient experimental data has resulted in considerable speculation on these mechanisms, and several different explanations of flame resistance have been proposed. They have not been studied except in a preliminary manner.

At the beginning of World War II the importance of reducing fabric flammability and the need for flame-resistant clothing textiles were emphasized by the use of flame throwers, incendiary bombs, highly combustible fuels, etc. Research and development programs were initiated by many of the service laboratories. Unfortunately the treatments then available were unsuited for military use, mainly because of the lack of durability. An intensive search was immediately undertaken in an effort to discover more efficient flame-resistant materials and practical methods for their application with existing facilities. The Research and Development Branch, Military Planning Division, Office of The Quartermaster General, established a research project in the Department of Chemical Engineering at Columbia University on flame-resistant fabrics for army clothing. The results obtained from this program, covering a period of approximately three years, are available *(1)*. Some information has also been obtained from the projects supported by the Corps of Engineers, Chemical Corps and the Navy. There is also probably available, but as yet unpublished, a great deal of information from industrial laboratories and other research organizations interested in this problem. Extensive studies were completed on possible compounds and the methods of application. This work was in addition to the study of methods of evaluation and the standardization of tests.

On the basis of the information available it may be stated that there remains a need for a more efficient type of flame-resistant treatment for textile fabrics, particularly for clothing application. Greater durability, minimum add-on and other requirements have not been satisfied. The conclusion has been reached by many investigators that, in order to attain the desired type of flame resistance to meet the requirements, it is mandatory that basic research on the fundamentals of flame resistance be continued in order to understand the function of the flame-retardant chemicals and their behavior in contact with various fibers under the influence of flame or high temperatures. When the necessary fundamental data have been obtained, it can be expected that superior flame-resistant processes will be developed.

The principal effects of flame-resistant compounds have been demonstrated to be the influence on the rate and the extent of formation of the thermal degradation products. Several mechanisms have been proposed to explain these effects. The chemical theories are probably the most important, although the others should not be neglected because the action of any specific compound requires a combination of the theories to explain the behavior observed. When the chemical composition of effective fire-resistant materials for application to textiles is examined, it is observed that many of the substances used might be expected to aid the decomposition of cellulose under the influence of heat. In addition many of the retardants are known to have a degrading action on cellulose at normal or slightly elevated temperatures, or in the presence of sunlight. These results might appear to be contrary to the retarding action in the presence of a flame, but it must be remembered that flame resistance does not require protection from damage to the area in the vicinity of the heat source but excludes propagation of the flame reaction.

Chemical substances, such as strong alkalies, mineral acids and oxidizing agents, have a degrading action on cellulose. It is interesting that these chemical substances are also most effective as fire retardants. Usually these chemical compounds cannot be used directly because of the tendering action on the fabric. A high

* Presented at the General Technical Session, Atlantic City Convention, October 13, 1949.

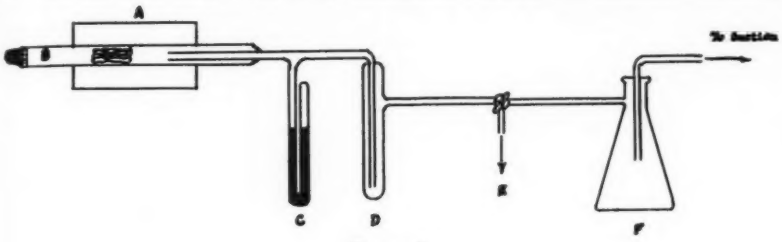

Figure 1

A. Combustion Furnace
B. Pyrolysis Tube
C. Manometer
D. Trap
E. Stopcock
F. Trap

temperature is necessary to produce the strong alkali or acid in order to cause the decomposition of the cellulose. Alkali salts of weak acids, such as borax, sodium carbonate and bicarbonate and sodium silicate, belong in this group of effective flame-resistant agents. A strong acid is produced at flame temperatures by salts of weak bases, such as ammonium phosphate, sulfamate and sulfate *(2)*.

The ideal mechanism for the decomposition of cellulose in the presence of a retardant would be the formation of solid carbon and water. This mechanism involves a catalytic dehydration process which has not been achieved. Since solid carbon, which is nonvolatile, and water are the only products formed, flaming cannot continue. This mechanism has been proposed by Leatherman *(3)* to explain the effect of metallic oxides, of which hydrated stannic oxide is an example. The hydrogen-bridging process *(1a)*, as a result of certain chemical groupings in flame-retarding chemicals, is another fundamental mechanism of somewhat wider applicability. The necessary groups exist in such retardants as the phosphates, sulfates and some sulfamates.

The coating mechanism *(1b)* for explaining fire-retardant action is interesting in that it involves the coating of cellulose with a nonpenetrable layer which excludes oxygen and prevents propagation of the combustion reaction. The effectiveness of borates and mixtures of borax and boric acid has been explained on this basis. Closely related to the coating theory is the gas-and-foam theory *(1c)*. The quenching action of gas evolution changes the concentration of the fuel and air mixture to such an extent that the rate of combustion is reduced, perhaps in some cases to zero. Carbon dioxide, ammonia, water vapor and sulfur dioxide are the gases usually considered to explain the effectiveness of sodium carbonate, ammonium halides and similar compounds.

It is believed that the thermal theories proposed have been less satisfactory in explaining the fire-retardant action. Briefly, the thermal theory requires that the fabric temperatures remain below the dissociation temperature. The energy from the heat source is used in the fusion, sublimation, or decomposition of the retardant. The experimental evidence for such a theory is not conclusive. Furthermore, since only small amounts of certain materials are effective as retardants, it is unreasonable to expect such efficient heat-exchange capacity. A combination of several of the processes mentioned must be responsible for the efficiency.

Within recent years it has been recognized that the control of afterglow is an important factor in any flame-retardant treatment or theory. The after-glow is presumably caused by the oxidation of carbon, which is the main constituent of the charred residues. Numerous metallic oxides have a catalytic action on the oxidation of carbon and consequently continue the destruction of the fabric without flaming. The mechanism necessary for the desired reaction undoubtedly involves changes in the energy barriers, such as the heats of activation for the reactions involved. Whether the prevention of afterglow will be explained on the basis of a chemical or a physical theory has not been proved. A physical theory, such as insulation, or a noncombustible layer coating the carbon surface to isolate it from contact with the oxygen in the air, has not been substantiated by experimental evidence. It is hoped that more fundamental data will be obtained on which to base a conclusion. The present theories are somewhat confused, and efficient flame-resistant and glow-resistant fabrics will not be produced until this fundamental information is available and utilized.

Oxidation kinetic studies by Little, Church, Coppick *(1d)*, and others have demonstrated that the effect of common flame-resistant materials is to reduce the rate of formation and the amount of carbon dioxide. It is believed that the heat liberated in the reaction

$$C\ (s) + \tfrac{1}{2}\ O_2\ (g) \longrightarrow CO\ (g)$$
$$\triangle H = -26.39\ \text{kcal.} \qquad (1)$$

is sufficient to propagate the afterglow when the source of flame has been removed. The highly exothermic reaction

$$C\ (s) + O_2\ (g) \longrightarrow CO_2\ (g)$$
$$\triangle H = -94.03\ \text{kcal.} \qquad (2)$$

is suggested as the glow-sustaining process. With charred fabrics, the formation of carbon dioxide has been shown to be reduced by nonpermanent, water-soluble retardants such as diammonium phosphate, boric acid, borax, sulfamate, etc.

In order to obtain fundamental information on the reactions and their mechanism, the thermal degradation of cellulose with added retardants at temperatures of 400-600°C. has been investigated. It was desired to reduce the carbon dioxide formed after the initial heat source has been removed. Experiments were designed to direct this oxidation process to the formation of carbon monoxide (Equation 1).

Thermal degradation of cellulose involves decomposition at elevated temperatures, together with the simultaneous distillation of the reaction products. The tarry distillate, gases and charred residue, which are the thermal decomposition products from cellulose, with added retardants, have a complex composition. The reaction products are the result, not only of the complete destruction of the cellulose, but also of secondary and tertiary reactions. These reactions have been separated into their component parts, and the properties of the individual products investigated by Coppick *(1d)*.

The aqueous distillate formed at approximately 200°C., and as the temperature was increased the gases were evolved. At temperatures of approximately 270°C. the reaction became vigorous, and the rate of formation of decomposition products reached a maximum. The fact that the reaction was exothermic indicated that secondary and tertiary reactions occurred to a considerable extent at this temperature. After the vigorous reactions ceased, a further increase of the temperature resulted in the slow formation of distillation products. The process reached a maximum above 450°C. The residue consisted of a coke-like substance.

The aqueous portion of the distillate contained a small quantity of acetic and formic acids, aldehydes, ketones, furfural and pyroligneous substances. The tars consisted for the most part of phenol, carbolic acid, and small amounts of cresol and toluene *(4)*.

Carbon dioxide, carbon monoxide, and traces of methane, ethylene and formaldehyde have been identified in the gases. At temperatures above 300°C., 75% of the gas consisted of carbon dioxide *(4)*.

The coke had a composition similar to

coal except that the hydrogen content was somewhat lower. Bergius *(4)* has explained the lower hydrogen content of the cellulose coke as the result of overheating caused by the exothermic heat evolved during the thermal decomposition. Waterman *(5)* heated cotton cellulose under pressure at 225-450°C., and after 225°C. a black residue resembling coal was obtained. The weight was 85% of the original sample. The analysis of the coke after one hour at 300°C. was carbon, 71% and hydrogen, 5.2%. At 450°C. it was 85.7% carbon and 5% hydrogen. The products of the reaction at 300°C. were stated to be carbon dioxide and water; and at 450°C., carbon dioxide, water, carbon monoxide, methane and other paraffins.

Cellulose decomposes at flame temperatures into tar, char, water and gases. The char may react with oxygen in the air to form additional gases. The tar component is very flammable. Fire-retardant chemicals are believed to promote the decomposition of cellulose toward the formation of char, water and gas and to reduce greatly the amount of flammable tarry products. It is hoped to direct the decomposition by means of a suitable catalyst toward non-volatile products. If no combustible volatile products are evolved, no flame can result. If volatile products are produced, it is hoped that they will be of a highly oxidized, non-flammable type.

It is generally agreed that the thermal degradation of cellulose is a three-step reaction involving the processes of initial breakdown, flaming, and afterglow. These processes may be described briefly as follows: The primary reaction, that of decomposition, proceeds rapidly with the formation of a charred residue composed mostly of carbon, the highly flammable tarry distillate, and a volatile fraction composed of water vapor and fixed gases. The addition of the fire retardant will alter the ratio of these primary decomposition products. The amount of char is increased, tars are reduced, and the volatile fraction is increased. The secondary reaction, that of flaming, involves the cracking and burning of the volatile tars produced in the first phase of the reaction. Flame retardants reduce the production of such tars and consequently reduce the available fuel supply. The tertiary reaction, that of afterglow, involves the oxidation of the charred residue to either predominantly carbon monoxide or carbon dioxide, depending upon the effectiveness of the catalyst used. The reaction to form carbon dioxide has an exothermic heat of formation of 94.4 kilocalories (Equation 2), whereas the reaction to produce carbon monoxide has a value of only 26.4 kilocalories (Equation 1). It is reasonable to state that the reaction favoring carbon dioxide formation with the greater heat of reaction would sustain the afterglow.

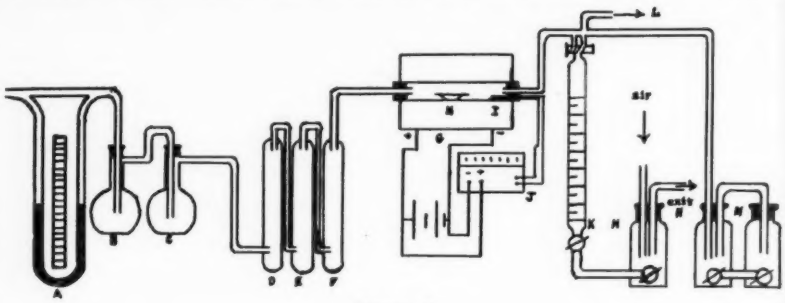

Figure 2

A. Flowmeter
B. NaOH Absorber
C. Trap
D. $CaCl_2$
E. Anhydrone
F. Ascarite
G. Heater
H. Boat
I. Thermocouple
J. Pyrometer
K. Gas-Collection Buret
L. Exit to Analyzer
M. Liquid Reservoir
N. Gas-Collection Bottle

During the primary reaction it is believed that the micellar surface of the cellulose is stripped of its hydroxyl groups, exposing an active carbon surface on the char, which is susceptible to oxidation during the tertiary reaction. The addition of certain catalysts that may be adsorbed by these active centers would tend to inactivate the surface and remove the carbon from further reaction with oxygen from the air.

EXPERIMENTAL

20/2-ply undyed cotton yarn, commonly used in the manufacture of 8- and 8½-oz. cotton cloth was used. A diagram of the apparatus constructed for the pyrolysis experiments is shown in Figure 1. It consisted essentially of a pyrolysis tube, B, which was heated in a combustion furnace, A. The pyrolysis was completed under vacuum to remove the tars and volatile substances to produce a pure char.

The apparatus for the oxidation of the charred residue is shown in Figure 2. It consisted of a drying and purifying apparatus for the incoming air, which was introduced into the oxidizing tube at a controlled rate. A thermocouple connected to an electric pyrometer was used to control the desired temperature. The exhausted gases were collected under pressure over an aqueous solution by displacement. These samples were analyzed for carbon monoxide and carbon dioxide with a standard gas-analysis apparatus.

An approximate one-gram sample of yarn was dried for 16 hours at a temperature of 120°C. and weighed. The sample was treated with a catalyst prepared by the following procedure: one gram of the chemical compound to be tested was dissolved in 100 ml. of a solvent after which a 10-ml. aliquot of the solution was added to the sample, to which was added one drop of a wetting agent to provide complete penetration. This procedure gave an add-on of approximately 10% of the compound. The sample was oven-dried for approximately 12 hours at 120°C. and weighed. This dry treated sample was placed in the pyrolysis tube and the system evacuated to 5 mm. of mercury. It was then placed in a standard combustion furnace at 500°C. for 10 minutes. After two to three minutes at this temperature a large quantity of water vapor was evolved, followed by the appearance of a thick, dark-brown, sirupy substance with the odor of burnt sugar. At the end of this process the char was cooled under vacuum and oven-dried for 12 hours at 120°C. and weighed. The difference in weight between the sample and the char was an indication of the effectiveness of the catalyst in reducing the tarry distillate.

In the oxidation of the charred residue, dry, carbon-monoxide- and carbon-dioxide-free air were passed through the oxidizing chamber at the rate of 180 ml./min. The charred residue was placed in a combustion boat and inserted into the oxidation chamber, which was maintained at a constant 500°C. The char was allowed to oxidize for 30 minutes. Samples were collected in the gas collecting tube. The total volume of gas liberated was collected over an aqueous solution of sodium sulfate and sulfuric acid, to

TABLE I
Effect of Various Chemical Compounds on the Weight of Char and Volume of Gases Produced

Compound	Weight of Char, g.	Loss after Charring, g.	Loss, %	CO_2, %	CO, %	Ratio CO/CO_2
1. Blank	0.1876	0.8124	73.8	12.1	1.35	0.112
2. Quadrafos	.4550	.5936	54.7	4.1	16.5	4.025
3. Rezgard-A	.3446	.6063	55.1	3.8	6.4	1.670
4. DuPont-CM	.3122	.6708	60.9	3.6	6.0	1.665
5. Ammonium-Bifluoride	.2601	.8782	79.7	4.6	5.4	1.170
6. Ammonium Meta-Vanadate	.2451	.6892	62.6	4.2	4.4	1.080
7. Flamort-TC	.7678	.3073	27.9	7.0	7.6	1.080
8. UDAP 2:1	.2187	.8181	74.5	6.0	6.0	1.000
9. Phosphated Aniline	.7613	.3062	28.6	6.6	6.4	0.970
10. Flamort-W	.7208	.2978	27.1	8.0	7.0	.875
11. Flamort-T	.7350	.4021	36.6	8.2	6.8	.829
12. Potassium Periodate	.2235	.9221	83.7	6.2	5.0	.806
13. Protextile	.6909	.4263	38.8	8.0	5.8	.726
14. Phosphotungstic Acid	.2624	.8260	75.1	5.4	3.8	.704
15. Sodium Meta-Vanadate	.3366	.6488	58.9	6.7	4.2	.627
16. Sodium Silico-Fluoride	.2238	.7859	72.4	6.0	3.5	.584
17. Melamine Phosphate	.2826	.8174	74.3	6.4	3.6	.562
18. Sodium Silicate	.3315	.7362	66.8	7.4	3.4	.460
19. Vanadium Pentoxide	.3678	.7344	66.8	5.4	2.4	.444
20. Mercuric Arsenate	.2959	.7669	69.7	10.8	4.6	.422
21. Potassium Tantalate	.3373	.6438	58.4	8.8	3.6	.408
22. Ammonium Molybdate	.3493	.6166	56.0	4.0	1.6	.400
23. Sodium Bismuthate	.3315	.7362	66.8	7.4	3.4	.388
24. o-Chloro Aniline	.8070	.1751	15.6	9.4	3.6	.383
25. 2,5 Dichloro-Aniline	.6251	.3846	34.9	11.0	4.2	.382
26. Aluminum Tungstate	.5047	.6000	54.5	7.4	2.6	.352
27. Sodium Tungstate	.3408	.6925	63.1	11.2	3.8	.342
28. Diethyl Aniline	.6236	.7331	66.6	7.6	2.6	.342
29. Aniline Oil	.6548	.3182	28.9	10.8	3.6	.330
30. Dimethyl Aniline	.6961	.3195	39.0	7.4	2.4	.324
31. Tungstic Trioxide	.5168	.5837	53.0	9.8	3.2	.324
32. Potassium Fluoride	.3650	.6772	61.6	9.4	3.0	.319
33. Sodium Vanadate	.1952	.7475	68.0	10.2	3.2	.317
34. Sodium Fluoride	.3420	.7141	64.9	8.4	2.5	.298
35. Uric Acid	.7130	.4978	45.2	10.2	3.0	.297
36. Sodium Arsenate	.3337	.7303	66.4	9.6	2.8	.292
37. p-Chloro Aniline	.7033	.3046	27.7	11.2	3.2	.288
38. Potassium Tungstate	.4469	.6969	62.4	13.0	3.8	.282
39. Sodium Iodate	.2837	.8030	73.0	8.0	2.2	.275
40. Selenous Acid	.5176	.5055	45.8	13.2	3.6	.274
41. Thorium Nitrate	.2820	.7204	65.5	3.0	0.8	.267
42. Sodium Stannate	.3832	.6959	63.3	6.0	1.6	.266
43. Tungstic Acid	.3708	.6420	68.4	10.8	2.6	.238
44. Sodium Perborate	.3658	.7133	64.8	10.2	2.4	.237
45. m-Phenylene Diamine	.6943	.3930	35.8	11.8	2.6	.218
46. Phenyl Hydrazine Hydrochloride	.6955	.3657	33.2	11.0	2.2	.200
47. Titanium Oxide	.7836	.2745	24.7	10.0	2.0	.200
48. 2,4 Dinitrophenyl Hydrazine	.7859	.2678	24.4	10.8	1.8	.165
49. Potassium Antimonate*	.4427	.6117	55.4	—	—	—
50. Potassium Aluminate†	—	—	—	—	—	—

* The char could not be effectively removed from the pyrolysis tube. Oxidation was not possible.
† No char was produced. Sample was completely destroyed when heated.

which methyl orange was added to indicate any change in the pH. A 100-ml. sample of the gases was collected in the gas-analysis apparatus and analyzed for carbon monoxide and carbon dioxide by absorption in KOH and acid cuprous chloride solutions.

EXPERIMENTAL RESULTS

The experimental results obtained with 50 catalysts are summarized in Table I. In these experiments to determine the influence of various chemical compounds on the oxidation of the chars, no group of compounds exhibited satisfactory glow-proofing properties. When compared with an untreated sample, the samples treated with several commercial products now available showed promise of retardation.

Cellulose, which is a solid organic substance with negligible vapor pressure, should not be expected to be flammable. The burning of cellulose must be caused by the flammable vapors produced at temperatures above which it decomposes.

In considering the mechanisms whereby flame-retardant materials become effective, three theoretical possibilities may be considered:

First, a process in which the decomposition of cellulose is retarded. There can be no burning unless flammable vapors are produced. This result could be obtained by the introduction of a negative or retarding catalyst, or by inactivating a positive catalyst already present in the natural product. The possibility also exists that the fiber could become physically insulated by a coating of retardant, which would protect the fiber from direct contact with the flame.

Second, the introduction of a catalyst which would direct the decomposition toward nonvolatile reaction products. The decomposition would be directed toward the most elemental state, by-passing the intermediate flammable stages.

The third possibility is that, if volatile combustion products are produced, they are of a nonflammable type. The catalyst would function to promote decomposition toward highly oxidized volatile products.

The mechanism proposed by Coppick *(1d)* suggested the addition of an oxidizing agent instead of oxygen, which is normally supplied by air. The six oxygen molecules required are supplied by the retarding agent. It is believed that such a mechanism would result in a pronounced afterglow, since any reaction of this type directed toward the production of carbon dioxide is highly exothermic. Directing the reaction toward the production of carbon monoxide would produce less afterglow. The results obtained in this investigation substantiate the fact that fire-retardant materials that are effective produce a greater amount of carbon dioxide (Table I). This investigation was based on the assumption that certain chemical compounds could be found that would direct the oxidation of cellulosic chars and reduce the amount of carbon dioxide formed after the initial heat source was removed.

During the pyrolysis of a sample of the cotton yarn, water vapor and other gases were liberated immediately. A brown-colored sirupy substance followed with an odor of burnt sugar. The color and viscosity increased as the heating continued. Additional decomposition products were not observed after four or five minutes. The samples that were treated with effective materials produced a black char with a high tensile strength and yarn characteristics. With the other samples the char was a brittle, amorphous, black, coke-like substance. It was observed that the chars from the effectively treated samples produced an almost odorless gas during oxidation. The gases from samples not effectively treated had a sharp odor not unlike formaldehyde. A comprehensive review of the degradation reactions of cellulose has been given by Rutherford *(6)*.

The phosphate radical in a compound had the greatest effect in reducing the production of carbon dioxide. Quadrafos, a highly phosphated compound, produced the highest carbon monoxide: carbon dioxide ratio of the catalysts tested.

The compounds of vanadium and those containing halogens were effective in promoting the formation of carbon monoxide rather than the dioxide. Several compounds of aniline were tested to determine the flame- and glow-retarding effects. The aniline was incorporated in a compound with the phosphate radical. As a group, the aniline compounds were located in approximately the middle of the series, but the phosphated aniline was an effective treatment. It was insoluble in water and soluble only in hot ammonium hydroxide solutions. The permanence-to-leaching action was not investigated because such measurements were beyond the scope of this project. The catalyst potassium antimonate produced a hard, crisp char which could not be satisfactorily removed from the pyrolysis tube. The catalyst potassium aluminate produced a char similar to the antimonate. The remainder of the catalysts investigated were specific in their action, and no particular group of anions or cations was found to be effective in producing the desired reaction. It was not considered profitable to continue the investigation of those compounds that were compatible with cotton, such as aniline and melamine. If those compounds can be satisfactorily combined with phosphate to produce a water-insoluble compound, an effective catalyst may be produced. On the basis of the results obtained, it was concluded that one of the most significant functions of a satisfactory flame and glow retarding compound was to decrease substantially the amount of carbon dioxide resulting from the thermal decomposition of the cellulose. It should also promote the production of carbon monoxide during degradation. The samples of yarn treated with effective materials produced chars which were pliable, with a high tensile strength, and which retained the original yarn characteristics except for the black color. Catalysts containing the phosphate radical were most effective in producing high carbon monoxide: carbon dioxide ratios. Vanadium compounds and halogens were next in order of effectiveness. Those catalysts which showed evidence of effective glow-resistant properties produced a black ash, which retained the visible characteristics of the original fiber. A white powder remained from the samples when the catalysts were ineffective. The textile-finishing materials, such as dye intermediates, melamine resins, mordanting compounds, and possibly water-resistant compounds of an organic nature, may be compounded with phosphate to produce a permanent retardant.

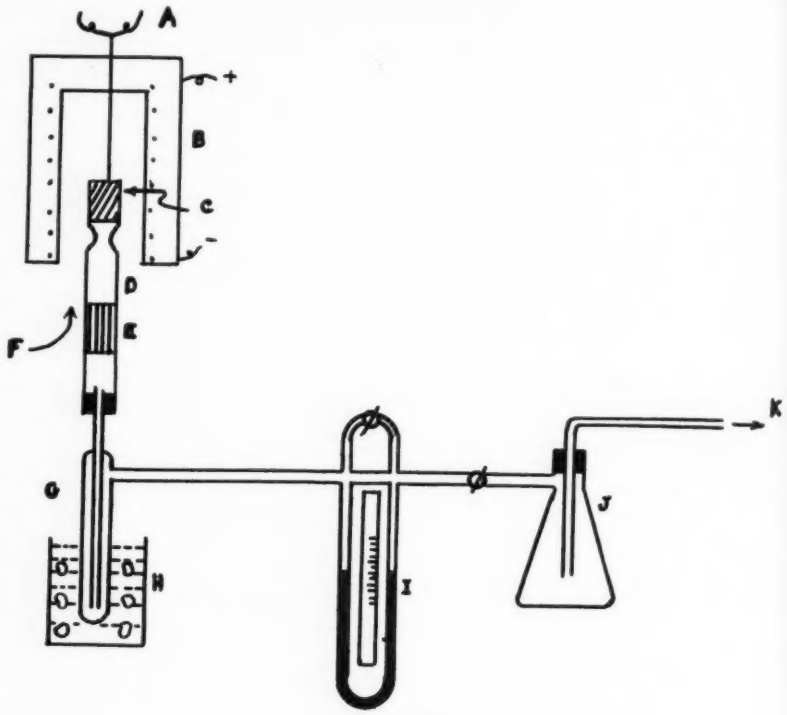

Figure 3

A. Thermocouple
B. Heater
C. Cotton
D. Combustion Tube
E. Glass Wool
F. Air
G. Trap
H. Ice Water Bath
I. Manometer
J. Trap
K. Aspirator

Since the tarry products formed during the oxidation of cellulose are highly flammable, the possibility of decreasing and perhaps preventing their formation with the aid of a catalyst was investigated. It might also be possible to direct the oxidation to completion. The weight of catalyst used was 1% or less, based on the weight of the sample. This low add-on would greatly improve the fabric properties over those obtained by present processes, which employ an add-on of 15-30%. Infrared absorption spectra have indicated that the tars formed contain aldehydes, ketones, esters and alcohols. The tars are soluble in acetone, less soluble in isopropanol, and sparingly soluble in water. It has been reported that flame-resistant materials reduce the amount but not the composition of the tars formed, and that the flammability of the cotton is related to the ratio of the tar to water in the distillate. Hurd *(5)* found that cotton loses 6-8% of its weight at 100°C., but regains the weight in moist air when cooled. Structural decomposition began at 162°C. The textile properties were destroyed at 249°C., at which temperature a brown color formed. Absorbent cotton, when heated for three hours at 260°C., became brown in color and partially water-soluble. Glucose, formic acid and some acetic acid were found in the tars (no pentoses). Cellulose (cotton), when heated, decomposed to form levoglucosan, aldehydes, ketones and furfural.

A diagram of the apparatus used to study the char and tar formation in the oxidation of cellulose is shown in Figure 2. The apparatus consisted of a heater for use at temperatures of 400-500°C. A one-gram sample of pure cellulose (absorbent cotton) was coated by absorbing six ml. of a solution containing the weight of catalyst add-on desired. The treated sample was maintained at a temperature of 75°F. and 65% relative humidity for 24-48 hours and then burned at 500°C. During the combustion, air was passed through the sample at the rate of 180 ml./min. The tars formed and the residue were collected and weighed. The combustion tube, Figure 3, was constructed similar to that

TABLE II

Effect of Alkali Metals on the Formation of Char and Tar From the Oxidation of 1 g. Cellulose (Cotton)

Blank: 1 g. Cotton; Char = 0.0821 g.; Tar = 0.7671 g.

Catalyst, Add-on, %	0.25		0.50		0.75		1.00		*Decrease in Tars Formed*
	Char g.	*Tar* g.	*Char* g.	*Tar* g.	*Char* g.	*Tar* g.	*Char* g.	*Tar* g.	%
LiCl	0.1036	0.7256	0.1199	0.6872	0.1354	0.6360	0.1407	0.6260	18.4
NaCl	.1114	.6935	.1239	.6655	.1214	.6552	.1304	.6210	19.4
KCl	.1109	.6711	.1264	.6470	.1214	.6215	.1139	.6320	17.6

used by Church, Coppick, et al. *(1)* from an 8-inch test tube. The bottom was removed so that the tube had a total length of approximately 20 cm. The tube was constricted 5 cm. from the bottom to form the top of the combustion chamber. This constriction prevented the cotton sample from dropping into the tars when burned. Glass wool was used in the tube as shown in the diagram. The catalyst to be tested was dissolved in a suitable solvent in the concentration desired, and a 6-ml. aliquot of the solution was used because it was found that it was easily absorbed by the cotton and would distribute the catalyst uniformly.

The experimental results obtained on the effect of various catalysts and the amount added on the formation of char and tars from 1 g. of cotton are summarized in Tables II, III, IV, V, VI, VII and VIII. During the combustion of a sample of cellulose (5 min.), the following observations were made: At the end of 30 seconds moisture was observed in the glass wool. After 1-1.5 minutes a light yellow-colored liquid condensed on the upper part of the glass wool. After 2 minutes the yellow-colored liquid turned to a brown-colored solid. After 3-5 minutes yellow, brown and dark-brown-colored solids appeared on the top inch of the glass wool. There was very little change in the appearance of the glass wool after the first 3 minutes.

CONCLUSION

The results may be summarized as follows: Each of the catalysts tested, with the exception of G-5, (chlorinated fungicide), decreased the amount of the tars formed. The alkali-metal salts caused the greatest decrease in tar formation. They decreased the carbon content of the tars and formed a light-brown-colored tar. There was an increase in the amount of char formed with the decrease in the atomic weight of the metals. An increase in the molecular weight of the halides, as the sodium salt, caused an increase in the weight of the char and tar formed. Sodium bromide caused an increase in char of 100%, and sodium iodide 126%. The carbon content of the tar increased with an increase in the molecular weight of the halide. An increase in the amount of catalyst from 0.21-1.0% caused a decrease in the formation of tar. In other words, the results obtained with the alkali metal salts showed that sodium bromide was the most efficient and decreased the tar formation 21.2% less than the blank determination at 1% add-on. It also caused an increase in the char to twice that of the blank. The organic chlorinated fungicides containing various amounts of chlorine had little or no effect on the tar formed. The following catalysts produced the most satisfactory results in decreasing the formation of tar: lithium chloride and carbonate, sodium chloride and carbonate, and potassium chloride. These chemical compounds decreased the formation of tar as much as 83% of the quantity obtained from the untreated cotton. The results obtained with various anions indicated a decreasing order of effectiveness as follows: carbonate, phosphate, metavanadate, sulfate, molybdate, dichromate and nitrate. The carbonate and chloride of lithium were equally effective in decreasing the formation of the tar. Since sodium chloride and carbonate produced the same results, the cation was the determining factor. Zinc chloride and calcium chloride caused the greatest increase in the weight of the char (approximately twice that of the blank). The tar was correspondingly reduced. Zinc, barium, and calcium chloride caused a dark-colored tar (carbonization) to form. In the other experiments, such as lithium chloride and carbonate (1% add-on), potassium and sodium chloride, the tar was brown-colored. An afterglow was observed with the catalysts investigated except the borates, phosphates, cerium sulfate, and antimony, chromic, and zinc chlorides. With these latter compounds the afterglow was very weak. The alkali-metal and alkaline-earth salts permitted an afterglow. Catalysts most effective in preventing afterglow were the phosphates and borates.

The results reported by many previous investigators and the results of this investigation have proved that the phosphate radical can be responsible for establishing a fire-retardant mechanism when applied to cotton fabrics. Phosphate salts in general have the greatest effect in reducing the amount of tar and carbon dioxide formed during the thermal degradation of cellulose. A satisfactory process to fix the phosphate firmly to the fiber is not available. This problem must

TABLE III

Effect of Halogens on the Formation of Char and Tar From the Oxidation of 1 g. Cellulose (Cotton)

Blank: 1 g. Cotton; Char = 0.0821 g.; Tar = 0.7671 g.

Catalyst, Add-on, %	0.25		0.50		0.75		1.00		*Decrease in Tars Formed*
	Char g.	*Tar* g.	*Char* g.	*Tar* g.	*Char* g.	*Tar* g.	*Char* g.	*Tar* g.	%
NaF	0.0756	0.7115	0.0991	0.6658	0.1340	0.6185	0.1403	0.6171	19.5
NaCl	.1114	.6935	.1239	.6655	.1214	.6552	.1304	.6210	19.4
NaBr	.1053	.7003	.1295	.6630	.1313	.6398	.1680	.6047	21.2
NaI	.1160	.6608	.1405	.6557	.1502	.6260	.1815	.6100	20.5

TABLE IV

Effect of Sodium Compounds on the Formation of Char and Tar From the Oxidation of 1 g. Cellulose (Cotton)

Blank: 1 g. Cotton; Char = 0.0821 g.; Tar = 0.7671 g.

Catalyst, Add-on, %	0.25		0.50		0.75		1.00		*Decrease in Tars Formed*
	Char g.	*Tar* g.	*Char* g.	*Tar* g.	*Char* g.	*Tar* g.	*Char* g.	*Tar* g.	%
NaBr	0.1053	0.7003	0.1295	0.6630	0.1313	0.6398	0.1680	0.6047	21.2
NaOOCH ...	.0878	.6955	.0958	.6513	.1001	.6223	.1233	.6090	20.6
NaI	.1160	.6608	.1405	.6557	.1502	.6260	.1815	.6100	20.5
Na_2CO_3	.0839	.7090	.1022	.6502	.1089	.6330	.1175	.6135	20.0
NaF	.0756	.7115	.0991	.6658	.1340	.6185	.1403	.6171	19.5
NaCl	.1114	.6935	.1239	.6655	.1214	.6552	.1304	.6210	19.4
$Na_3[Co(NO_2)_6]$	.0822	.7294	.0765	.6978	.0944	.6660	.1025	.6406	16.5
$Na_2AsO_4.12H_2O$	.0905	.7248	.1000	.6856	.1087	.6608	.1173	.6608	13.8
DuPont-CM ..	.1015	.7289	.1127	.6856	.1263	.6884	.1363	.6728	12.3
Na_2HAsO_3 ..	.0878	.7333	.1103	.7069	.1155	.6970	.1278	.6760	11.8
$NaVO_3$	.1230	.7262	.1320	.7115	.1341	.7070	.1300	.6825	11.0
$Na_2B_4O_7.10H_2O$	.0790	.7217	.0922	.7053	.1077	.6966	.1072	.6976	9.1
$NaBiO_3$	.0707	.7357	.0965	.6990	.0802	.7250	.0852	.7152	6.7

be solved by further work to secure permanence to the leaching action of water and soap solutions.

Aniline oil, organic silicones, and melamine formaldehyde resins were reacted with various phosphate compounds. The products obtained were applied to cotton cloth and the combustion properties studied. The preliminary results were interesting. Hexamethyldisiloxane was reacted with 85% o-phosphoric acid to produce a colored oil, which, when applied to cloth, imparted excellent fire-retarding properties. The treatment was unsatisfactory when leached and laundered. The cloth was tendered slightly, but had no other detrimental effects, such as stiffening or coloration. Several other siloxane compounds were investigated, but no satisfactory reaction with phosphate was obtained. Several commercial processes have incorporated phosphates in resins of the melamine-formaldehyde type and applied the product to textile fabrics with fairly satisfactory results.

This investigation will be continued in order to accumulate fundamental information to provide a more complete understanding of the mechanism of controlled fabric flammability.

TABLE VIII

Effect of Various Catalysts on the Formation of Char and Tar From the Oxidation of 1 g. Cellulose (Cotton)

Blank: 1 g. Cotton; Char = 0.0821 g.; Tar = 0.7671 g.

Catalyst, Add-on, %	0.25		0.50		0.75		1.00		Decrease in Tars Formed
	Char g.	Tar g.	Char g.	Tar g.	Char g.	Tar g.	Char g.	Tar g.	%
$LiCO_3$	0.0930	0.7162	0.1055	0.6909	0.6990	0.6678	0.1305	0.6309	17.7
K_2CO_3	.0749	.7054	.0748	.6675	.0898	.6414	.0948	.6333	17.4
$Cu_3(PO_4)_2$	.1229	.7014	.1419	.6840	.1385	.6484	.1531	.6448	15.9
$NH_4H_2PO_4$ ..	.1280	.7177	.1604	.6690	.1759	.6628	.1924	.6502	15.2
$KSbO_3$	.0958	.7107	.0792	.7075	.0832	.6920	.0940	.6677	12.9
$Ce(SO_4)_2.4H_2O$	.1073	.7485	.1310	.7118	.1305	.6917	.1380	.6905	9.9
NH_4MoO_3	.1067	.7361	.1084	.7157	.1334	.6885	.1414	.6957	9.3
$NiSO_4(NH_4)_2$ $SO_4.6H_2O$ ...	.0973	.7435	.1220	.7104	.1240	.7185	.1400	.7013	8.7
$CrPO_4.3H_2O$.	.1108	.7435	.1238	.7117	.1241	.7127	.1328	.7034	8.5
$Ni(NO_3)_2.6H_2O$	.0925	.7402	.0933	.7094	.0913	.7121	.1011	.7196	6.2
$(NH_4)_2Cr_2O_7$.	.0944	.7282	.1181	.7076	.0932	.7117	.1027	.7200	6.1
$Th(NO_3)_2$	.0902	.7642	.0920	.7366	.0998	.7466	.1041	.7230	5.7
$CaCO_3$	.0748	.7407	.0783	.7466	.0728	.7538	.0825	.7432	3.1
$Ce(NO_3)_3$	.0837	.7536	.0978	.7460	.0963	.7224	.0790	.7570	1.3
$Ca_3(PO_4)_2$ ...	.0939	.7664	.0919	.7722	.0847	.7814	.0924	.7600	0.9

TABLE V

Effect of Metal Chlorides on the Formation of Char and Tar From the Oxidation of 1 g. Cellulose (Cotton)

Blank: 1 g. Cotton; Char = 0.0821 g.; Tar = 0.7671 g.

Catalyst, Add-on, %	0.25		0.50		0.75		1.00		Decrease in Tars Formed
	Char g.	Tar g.	Char g.	Tar g.	Char g.	Tar g.	Char g.	Tar g.	%
LiCl	0.1036	0.7256	0.1199	0.6872	0.1354	0.6360	0.1407	0.6260	18.4
NaCl	.1114	.6935	.1239	.6655	.1214	.6552	.1304	.6210	19.4
KCl	.1109	.6711	.1264	.6470	.1214	.6215	.1139	.6320	17.6
$ZnCl_2$	.1125	.7248	.1280	.7012	.1440	.6710	.1650	.6406	16.5
$FeCl_2.H_2O$ ..	.1065	.6985	.1175	.6813	.1390	.6596	.1350	.6615	13.8
$MnCl_2.4H_2O$ ..	.1174	.7255	.1107	.7132	.1300	.6952	.1269	.6615	13.8
DuPont-CM ..	.1015	.7289	.1127	.6856	.1263	.6884	.1363	.6728	12.3
$CrCl_3.6H_2O$ ..	.1088	.7045	.1158	.6945	.1223	.6885	.1138	.6780	11.6
$CaCl_2.2H_2O$ ..	.1015	.7672	.1170	.7231	.1420	.6863	.1450	.6884	10.2
$SbCl_3$	.1184	.7134	.1142	.7180	.1249	.6894	.1290	.6908	9.9
$NiCl_2.6H_2O$ ..	.1234		.1138	.7105	.1128	.7008	.1213	.6929	9.7
$FeCl_3$	.0929	.7168	.1099	.6502	.1134	.6920	.1029	.6957	9.3
$MgCl_2$	.0972	.7224	.0886	.7267	.0970	.7160	.1007	.7175	6.4
$PbCl_2$	.1005	.7400	.0870	.7311	.1200	.7090	.0990	.7259	5.3
$BaCl_2.2H_2O$ ..	.0895	.7605	.1000	.7430	.1048	.7239	.1158	.7350	4.1
AgCl	.0838	.7580	.1016	.7312		.7309		.7212	4.6

TABLE VI

Effect of Metavanadates on the Formation of Char and Tar From the Oxidation of 1 g. Cellulose (Cotton)

Blank: 1 g. Cotton; Char = 0.0821 g.; Tar = 0.7671 g.

Catalyst, Add-on, %	0.25		0.50		0.75		1.00		Decrease in Tars Formed
	Char g.	Tar g.	Char g.	Tar g.	Char g.	Tar g.	Char g.	Tar g.	%
$Cu(VO_3)_2$	0.1038	0.7535	0.1133	0.6989	0.1120	0.6904	0.1338	0.6720	12.4
DuPont-CM ..	.1015	.7289	.1127	.6856	.1263	.6884	.1363	.6728	12.3
$Th(VO_3)_2$	.0837	.7435	.1040	.7188	.1108	.7045	.1248	.6745	12.1
$NaVO_3$	.1230	.7262	.1320	.7115	.1341	.7070	.1300	.6825	11.0
$NH_4(VO_3)_3$ ..	.1166	.6992	.1053	.7259	.1101	.7129	.1121	.7086	7.6
$Al(VO_3)_3$	.0984	.7492	.1114	.7225	.1164	.6995	.1184	.7100	7.4
$AgVO_3$	.0920	.7966	.1018	.7418	.1121	.7167	.0958	.7445	2.9

TABLE VII

Effect of Organic Chloro-Compounds on the Formation of Char and Tar From the Oxidation of 1 g. Cellulose (Cotton)

Blank: 1 g. Cotton; Char = 0.0821 g.; Tar = 0.7671 g.

Catalyst, Add-on, %	0.25		0.50		0.75		1.00		Decrease in Tars Formed
	Char g.	Tar g.	Char g.	Tar g.	Char g.	Tar g.	Char g.	Tar g.	%
G-11	0.0724	0.7587	0.0973	0.7509	0.0863	0.7620	0.0933	0.7410	3.4
G-5	.0744	.7792	.0727	.7748	.0639	.7826	.0826	.7874	+ 2.6
G-4			.0815	.7702			.0875	.7669	0.0

G-11 bis(2-hydroxy-3,5,6-trichlorophenyl)methane.
G-5 bis(2-hydroxy-3,5-dichlorophenyl)methane.
G-4 bis(2-hydroxy-5-chlorophenyl)methane.

ACKNOWLEDGEMENT

This investigation was supported in part by the Office of Naval Research and the Research and Development Branch of the Office of the Quartermaster General. A research contract jointly sponsored by each Service between the Rhode Island State College and the Office of Naval Research, N8-onr-506, provided financial assistance, which is gratefully acknowledged.

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Hosiery Group—

NYLON STAPLE IN HOSIERY*

D. H. HECKERT

Sales Development, Nylon Division, E. I. du Pont de Nemours & Company

The manufacture of nylon staple and its uses are briefly presented in a non-technical manner. Wear resistance, pilling, boarding and counter appearance are discussed with special reference to hosiery. The use of shorter crimp-set staple in yarns of higher twist to attain better loft, better coverage, and less pilling is explained. The boarding of articles from crimp-set staple under high and low steam pressures is considered.

INTRODUCTION

MR. Chairman, Ladies and Gentlemen, it is a pleasure to be here with you in Atlantic City. I do appreciate this opportunity to discuss nylon-staple development and to bring you a summary of our studies directed to improve nylon staple, spun-nylon yarns and knitted-nylon end products. We sincerely hope that the information disclosed today will assist you in developing new and improved lines of spun-nylon articles for tomorrow's markets.

During the past several years, tremendous interest has developed in the use of spun-nylon yarns. Substantial poundages of nylon staple are being consumed in the form of hand and machine knitting yarns. This indicates that the men and women of America are recognizing the advantages offered by spun-nylon articles, such as freedom from shrinkage in washing, excellent body comfort, and outstanding durability.

It was only three years ago that we first met with you in New York City to discuss the properties of the new crimped nylon staple, which was then available in very limited experimental quantities. Since that meeting, a number of you have developed highly successful lines of articles knit from spun-nylon yarns. This work has led to a tremendous increase in the demand for nylon staple.

Since there are many of you who have had the opportunity to visit our Seaford Plant where nylon staple is being made, and who have expressed considerable interest in learning more about the production of nylon staple, let us take a trip to Seaford before we tackle the main subject in today's discussion.

PREPARATION OF NYLON STAPLE.—If the production of nylon yarn is to be directed into staple, it is necessary to give the yarn a mechanical crimp, which not only assists greatly in the processing of nylon staple into yarn, but also increases the loft and coverage of the spun-nylon yarns. The subject of crimp will be discussed in greater detail later.

In preparing the spun yarn for the drawing and crimping operations, the yarn from a number of spin bobbins is plied together to form a tow containing literally thousands of filaments. It is drawn and mechanically crimped in one continuous operation. Following the drawing and crimping operation the tow is cut to a desirable staple length, dried and baled for shipment to one of the many spinners currently using nylon staple.

Seaford is preparing 1½-, 3-, 6-, 10- and 15-denier-per-filament staples in lengths ranging from 1½ to 5". These staples can be spun successfully on all of the conventional spinning systems alone, or blended with natural or other synthetic fibers. The use of various deniers or the blending of nylon staple with natural fibers and other synthetic fibers makes possible the production of a large variety of machine knitting yarns. We are therefore not limited by the lack of a variety of machine knitting yarns in developing new lines of spun nylon and nylon-containing end products. For a moment let us stop to consider the properties that make nylon staple desirable for use in the knitting trade.

PROPERTIES OF NYLON STAPLE.—The outstanding basic properties of nylon staple that make it desirable for textile applications are its strength, its abrasion resistance, its dimensional stability in washing and wear, and its kindness of hand. These characteristic properties place the use of nylon staple in the textile trade on a very sound technical basis. Nylon's strength makes possible the spinning and knitting of very fine cotton-count yarns, as well as medium and coarse counts. Its ability to resist abrasion insures maximum life for these garments with minimum maintenance. At last the darning basket is on its way out. Stability in wear and washing insures constant maintenance of size throughout the life of the garment without the special use of hand laundering, mild soaps, luke-warm water, and special drying frames. The soft, kind hand of spun-nylon yarns insures maximum comfort.

To emphasize further the properties of spun-nylon footwear, the experience of a professional basket ball team of the National League can be cited as a typical example of the testing of spun-nylon socks under severe practical conditions. Here is their report:

The wear-life of nylon socks truly amazed them. Plenty of wear-life still remained even after 20 games. The normal life for sport socks used previously was 2-4 games, since they discarded socks as soon as holes developed.

Further advantages of spun-nylon socks for athletic wear are comfort, shape retention and ability to transmit perspiration to the atmosphere.

Periodically during the past several years, we have conducted consumer surveys by mail to establish the reaction towards spun-nylon end products, including especially footwear. These surveys place us in position to see spun-nylon articles from the customer's point of view. We have found that the retail trade is very cooperative in pointing out faults and needed improvements.

I would like to summarize the latest survey covering women purchasers of spun-nylon half hose in the Buffalo area, which is typical of previous surveys conducted in other areas. The half hose covered in this report have been worn for a period of 6 to 9 months, and averaged about 25 wearings. 96% of the women stated that they would rebuy spun-nylon

* Presented before Hosiery Group at Atlantic City Convention on Oct. 15, 1949.

hose for one or more reasons. Over 90% of the women were pleased with the way the socks laundered, pleased with the shape retention qualities, commented favorably on the appearance and style of the socks, claimed that spun-nylon half hose were very comfortable, and claimed the half hose were still wearable after 25 wearings and washings. No major objections were pointed out by this survey. This clearly indicates that spun nylon half hose are being favorably received.

However, there is still room for improvement. Customers would like improved elasticity, better fit around the ankle, and greater freedom from pilling. Studies have been conducted lately in an attempt to reduce the tendency of spun nylon hose to pill and to improve the appearance of nylon hose on the wearer's foot. Those of you working with spun-nylon articles are fully aware of these problems. Fortunately, we have progress to report on both subjects.

PILLING.—In tackling the matting or pilling problem, we studied in the laboratory the formation of pills on spun-nylon half hose and half hose representing other fibers. New equipment was designed and built to permit rapid duplication of actual wearing conditions. This equipment produced the same surface on half hose in a few hours as that obtained by 20 days of actual wear-testing. By carefully observing the formation of the pills and their growth in size, we learned a great deal about the actual mechanics of pilling and also observed a number of factors which contribute to the formation of pills. The results of these experiments are summarized as follows:

(1) All fabrics knit from yarns representing woolly types of staples have a tendency to pill. Some have a considerably stronger tendency to pill than others.

(2) Pills formed on knitted fabrics representing weak fibers break off readily during wear and disappear. In the laboratory testing, we found the pills from weak fibers imbedded in the coarse woolen fabric used on the Wear tester. Because of the great strength of nylon, the pills formed on spun-nylon articles hold tightly to the knitted fabric.

(3) Pills were found to form only after the ends of the filaments are teased out of the spun yarns to exceed lengths of ⅛ to 3/16". Ends of filaments extending less than ⅛" out of the fabric do not form pills, but do contribute greatly to good loft, coverage and hand.

(4) Knitted fabrics containing fibers with round, smooth surfaces pill faster than those containing fibers with rough surfaces. Obviously smoothness permits longer fibers to be teased from a fabric.

(5) Yarns containing low twist pill more readily than yarns containing higher twist. Twist binds the filaments together, making it more difficult to tease the ends out.

(6) Loose-fitting fabrics pill faster than the same fabrics held under tension. This emphasizes the need for better elasticity and better shape retention in spun-nylon half hose. More about this later.

(7) Following the same line of reasoning, we would expect that fabrics knit from yarns representing low denier per filament staples would pill more rapidly than those representing high denier staples, all other factors such as twist, finishing, etc., being equal.

On establishing these facts and drawing the above conclusions, we set out to find various means of preventing the individual filament ends from being teased out of fabrics knit from spun-nylon yarns. Only one method has been uncovered which does not adversely affect the quality of the spun-nylon half hose. This method involves the use of significantly higher twists than are currently being used in most spun-nylon machine knitting yarns. We have demonstrated that a twist multiple ranging from 4 to 4½ for cotton-spun yarns, which are later plied using a twist multiple of 3¼, gave very good resistance to pilling. We also have evidence indicating that, for spun-nylon yarns made from longer staple lengths, approximately the same degree of twist is required. We have not established the minimum twist for single yarns frequently used without plying. However, we do have limited data showing that slightly less twist is permissible for these yarns.

You probably wonder what happens to the loft or coverage and the hand of spun-nylon yarns when twists in this range are employed. Actually, in yarns spun from 1½" staple, little or no effect was observed in increasing the twist from a normal knitting twist to this level. In the case of yarns spun from longer staples ranging up to 5", there was some loss in coverage and loft. We do not consider the loss in coverage and loft to be too serious because it is possible to improve the loft through the use of shorter-length staples. The major portion of loft and coverage results from individual filament ends protruding from the body of the spun yarns. Therefore, through the use of shorter staples, we increase the number of filament ends and thereby increase the loft and coverage of the spun yarn.

Another method of improving the loft and coverage of spun nylon yarns is the use of crimp-set staple. This production differs from our regular crimped nylon staple in that the crimp has been firmly set in the fiber by a heat-setting procedure very similar to that used in preboarding continuous-filament nylon hose. This new staple does not lose crimp during the normal carding, roving and spinning operations, and consequently produces a loftier yarn than regular staple. The use of crimp-set staple not only improves the loft and coverage of spun-nylon yarns, but also improves the insulating value and the elasticity of knitted fabrics. Through its use, half hose can be knit which fit the ankle and have less tendency to pill. We are making only a small portion of our staple production available as crimp-set staple. We plan to increase the facilities for its production. We understand that several spinners, and at least one commission house, have installed crimp-setting equipment and are converting our regular staple production into crimp-set production. This new equipment should increase the amount of crimp-set staple available to manufacturers.

PREBOARDING CRIMP-SET HALF HOSE.—As some of you may know from experience, the boarding of spun-nylon hose made from crimp-set staple has proven to be a rather serious problem. We have demonstrated that by using a special skeleton half-hose form along with steam at a pressure of 35 to 40 lb. per sq. in., crimp-set half hose can be boarded to give them good counter appeal without adversely affecting loft and hand. The use of the skeleton half-hose form appears to be highly desirable for several reasons. It has a minimum amount of metal surface in contact with the half hose. Also, it permits rapid circulation of the steam throughout the knitted fabric and greatly reduces the amount of steam and time required to bring the half hose up to the desired temperature.

Unfortunately, about 99% of the equipment available in the trade today for the boarding of spun-nylon hose is designed to operate at a maximum pressure of 30 lb. per sq. in. The remaining 1% is designed to operate at a maximum pressure of 15 lbs. per sq. in. This equipment is not built to stand the steam pressure required to board half hose knit from our currently made crimp-set staple. We are now evaluating new crimp-set staples in hopes of establishing a crimp-setting procedure that will permit the use of the equipment available in the trade to board and give crimp-set hose the desired counter appeal.

SUMMARY

The characteristic properties of nylon staple, its strength, abrasion resistance, dimensional stability and kindness of

hand, place this fiber in the knitting trade on a very sound technical basis. Articles knit from spun-nylon yarns are being enthusiastically purchased by the retail trade and are giving very satisfactory service.

The pilling of spun-nylon articles, while not a serious problem, is causing some concern. It results from the teasing of filament ends from the knitted fabric and may be controlled by increasing the twist in the spun yarns. The loft, coverage and elasticity of spun-nylon yarns can be increased by using crimp-set staple, and by using shorter length staple.

Articles knit from our current crimp-set staple can be boarded by using steam at a pressure of 35 to 40 lbs. per sq. in.

We hope soon to have a crimp-set staple that can be satisfactorily boarded with equipment currently available in the trade to give good counter appeal.

DISCUSSION

Mr. Neary: Can nylon be crimp-set with the available Selton form?

Mr. Heckert: I believe it is possible, but the consumption of steam and the time required to reach the desired temperature would not be practical. It might be possible, however, to rout out the metal from the center of the Selton form so as to leave only a thin edge of the form and thus to make it work. In my experiments I have made a special form out of one-eighth-inch stainless-steel welding rod, bent to the desired shape and reinforced with a couple of cross members for rigidity.

Mr. Wicker: It was mentioned that some commission houses are installing equipment to set the crimp of an ordinary crimp staple. Will you please comment on the required conditions?

Mr. Heckert: I think I have already indicated in the paper that we are not quite sure what we should be using now because of the problem encountered in boarding half hose and sweaters. We are trying to establish new conditions that will allow us to put out a product that can be set in the trade at steam pressures of 15, 20, or 25 lbs. per sq. in. without changing the desirable properties of our current crimp-set staple. I am really dodging the question here, but I cannot give you the answer for any specific set of conditions. If you will wait for a few months, we shall probably announce something interesting, based on our experiments conducted at the plant.

Mr. Berger: What did you mean, Mr. Heckert, by the different kinds of staple and what is your new method of crimping staple?

Mr. Heckert: I referred to only one method of crimping, except that the crimp may be set or left unset. We take our regular staple and give it a treatment very similar to the boarding of continuous filament half hose and convert it into crimp-set staple.

Mr. Berger: Is that process similar to acetate crimping?

Mr. Heckert: Yes.

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Report of Southeastern Section

THE first meeting of the year for the Southeastern Section was held February 25, 1950, in Talladega, Alabama. Dr. Leonard E. Ravich, Vice President in Charge of Research, Vat Craft Corporation, discussed the new process for vat dyeing fabrics photochemically by the use of a radioactive source meterial, UA—1.

The banquet was held in the Purefoy Hotel and was followed by the General Electric film, "Textiles Unlimited." Approximately 125 members and guests attended the meeting.

S. Jack Davis, Vice Chairman of the Section, presided.

Photos taken at the meeting appeared in the April 3rd issue of A.D.R. on page P221.

Respectfully submitted,
RICHARD E. HUDSON, Jr., *Sec'y.*

—♦ ♦—

Report of New York Section Meeting

A meeting of the New York Section was held on March 3rd at the Hotel Statler, New York. An informal dinner preceded the meeting.

George O. Linberg and Arthur W. Etchells, National Vice Presidents, were introduced to the audience and Raymond W. Jacoby, Co-Chairman for the 1950 Convention, reported on progress.

Speakers for the evening were:

Elliot Broadbent, Manager, Glenlyon Print Works, "Does Management Appreciate Research?", and J. Robert Bonnar, Technical Manager, General Dyestuff Corporation, "AATCC Research and the Life of Mr. Jay Box."

Respectfully submitted,
NORMAN A. JOHNSON, *Sec'y.*

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Spring Meeting, Mid-West Section

THE Spring Meeting of the Mid-West Section will be held at the Hotel Schroeder, Milwaukee, Wisconsin, on Saturday, May 6.

The afternoon session will be concluded in time to allow members to listen to the running of the Kentucky Derby.

The afternoon program will be presented by the General Electric Company. R. W. Beaudway of their Chicago office will discuss "The Modernization of Textile Mills," and will supplement his talk with the colored sound motion picture "Textiles Unlimited." John Thompson, of their Special Products Division, Schenectady, New York, will describe and explain, with the help of the colored sound film "Curves of Color," the recording photoelectric spectrophotometer.

Dinner will be served at 6:30 p.m.

Lee G. Johnston, of the American Institute of Laundering, Joliet, Illinois, will be the speaker of the evening. Mr. Johnston, a textile chemist, will speak on "Consumer Problems Relating to Textile Processes."

EMPLOYMENT REGISTER

This column is open for two insertions per year, per member, without charge. Blanks can be obtained from, and filed with, the Secretary of the Association, Lowell Textile Institute, Lowell, Mass. It is understood that these will be open to inspection by prospective employers, who can obtain further information from the Secretary.

50-10

Education: New Bedford Textile Institute, textile manufacturing; with further textile studies in Mass. Inst. of Tech., and in Quartermaster Corps.

Experience: Manufacture of yarns and fabrics, including fabric design, plant layout and administration; direction of chemical and physical testing.

Age 42; married; references; Southern States preferred but not essential.

4-17, 5-1

50-11

Education: Bradford Durfee Technical Institute, honor student, to receive B.S. in 1950.

Experience: Chemist and laboratory head for 4½ years.

Age 32; married; references; New England or N. Y. State preferred, or middle West.

4-17, 5-1

50-12

Education: University, M.S.

Experience: microbiologist, expeditor, chemist.

Age 37, married; references; So. Conn. or New York City preferred but not essential.

5-1, 5-15

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Articles appearing in the *Proceedings* in recent issues of the *American Dyestuff Reporter* will be helpful to authors as models of form for the typing of manuscripts.

LITERARY STYLE AND FORM OF PRESENTATION.—In the writing of papers, authors are requested to observe a trenchant, simple style of writing directed to textile chemists and colorists with at least an elementary knowledge of chemistry, physics, mathematics, engineering, textile processes and textile machinery.

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Ralph M. Evans

Evans to Address Philadelphia Section

RALPH M. EVANS of Eastman Kodak Company will speak on "Seeing Light and Color" at the May 5th meeting of the Philadelphia Section to be held at Kugler's Restaurant. This meeting will be held jointly with the Philadelphia-Wilmington Color Group.

Mr. Evans was graduated from M.I.T. in 1928 with a B.S. in Optics and Photography. He was employed by 20th Century-Fox Film Corporation from 1929 to 1933 in color photography and process control work. In 1933 he went with De-Luxe Laboratories, Inc., New York, in research and control work where he remained until 1935. He joined Eastman Kodak in '35 and served for ten years in their Research Laboratories in the development of color processes and research on visual effects in photography. At present he is Superintendent in charge of color quality control of all color processes.

Mr. Evans, author of "An Introduction to Color", is a Counsellor of the Inter-Society Color Council on which he represents the Society of Motion Picture Engineers. He also holds membership in the following organizations: Colorimetry Committee of the Optical Society of America, Color Committee of the Illuminating Engineering Society, Color Committee of the Society of Motion Picture Engineers, Research Executive Committee of Illuminating Engineering Society Research Fund, Photographic Society of America and American Psychological Association.

The abstract of Mr. Evans' paper follows:

"The process of seeing is somewhat different from commonly accepted notions. Three sciences are involved in the understanding of its principles and characteristics. All vision of the external world requires light. Light is a physical phenomenon and the principles of its action are described by the science of physics. This light enters the eye of an individual and affects the nerve endings on his retina. From these an electrical current is produced which travels back to his brain. This part of the subject properly falls in the science of physiology. Certain effects produced in the brain follow well defined laws and are quite predictable in nature. These effects are embraced by the science of psychophysics.

"After a brief discussion illustrating the part played in vision by these differing types of action, the lecture is devoted to a carefully illustrated discussion of the way in which the mind interprets the information so received. A distinction is made between form and color vision and it is shown that for the most part what we see depends as much on ourselves and our experiences as on the external reality which the light presents to our eyes. The discussion then turns to the seeing of color and in particular to the seeing of colored objects. By an extensive series of pictures it is shown that seeing is largely a matter of recognition of objects with properties believed to be possessed by those objects. From this it is shown that the mind has the ability to see several things simultaneously at the same spot. It follows that it is not entirely the physical or physiological facts which determine what we see, but also to a great extent our knowledge of external reality as supplied by the mind. As the best example of this, it is shown how it is possible for a person to see simultaneously objects illuminated by light of a certain color and at the same time see the true colors of the objects themselves. This is one of the most basic types of vision and yet it cannot be predicted from the simple physics of the light or the known properties of the eye.

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Willy Dolder—Merchant, Bubeck & Dolder, Basle, Switzerland.

Raymond K. Gilmore—Salesman, Ultra Chemical Works, Paterson, N. J.

James T. Hall, Jr.—Salesman, F. H. Ross & Co., Atlanta, Ga.

Theodore J. Hamilton—Tech. Repres., Union Carbide & Carbon Corp., Charlotte, N. C.

George C. Harkins—Salesman, Amalgamated Chemical Corp., Philadelphia, Pa.

Mason Hayek—Research Chemist, E. I. duPont de Nemours & Co., Inc., Wilmington, Del.

Julius S. Magid—Leather & Fabric Dye Manufacturer, The Magidiz Co., San Francisco, Calif.

Harold P. Mansfield—Supt., J. W. Wood Elastic Web Co., Stoughton, Mass.

Eugene F. McCorsley—Colorist, Riegel Text. Corp., Trion, Ga.

Arthur T. McDowell—Salesman, Solvay Sales Div., Allied Chemical & Dye Corp., Cincinnati, Ohio.

Hawkins H. Menefee—Production Supt., The Holmen Co., Frisco, Texas.

Mario Menetto—Head Colorist, Tintoria tops-matasse, Torino, Italy.

Dinshaw A. Merchant—Chemist, Tata Mills Ltd., Parel, Bombay, India.

Henry L. Pero—Asst. Professor, Lowell Textile Inst., Lowell, Mass.

Charles H. Ratterree, Jr.—Chemist & Sales., Blackman Uhler Co., Inc., Spartanburg, S. C.

John S. Savage—Mgr., Bleachery, Clark Thread Co., Albany, Ga.

Howard M. Smith—Sales., National Starch Products, Inc., Atlanta, Ga.

Boyd F. Vaughan—Salesman, E. I. du Pont de Nemours & Co., Inc., Chicago, Ill.

Arthur C. Waldron—Tech. Sales., Textile Aniline & Chemical Co., Lawrence, Mass.

STUDENT

Charles S. Baker, III—Institute of Textile Technology. Sponsor: G. H. Coleman.

George M. Bryant—Institute of Textile Technology. Sponsor: G. H. Coleman.

Barton L. Hinkle—Institute of Textile Technology. Sponsor: G. H. Coleman.

Claude F. Hughes, Jr.—Institute of Textile Technology. Sponsor: G. H. Coleman.

Elvan E. Hutchison—Institute of Textile Technology. Sponsor: G. H. Coleman.

Joseph S. James, Jr.—Institute of Textile Technology. Sponsor: G. H. Coleman.

Charles B. Palmer—Institute of Textile Technology. Sponsor: G. H. Coleman.

Norman W. Touchette—Institute of Textile Technology. Sponsor: G. H. Coleman.

Wallace O. Wilson—Institute of Textile Technology. Sponsor: G. H. Coleman.

Norman F. Young—Institute of Textile Technology. Sponsor: G. H. Coleman.

Harold A. Bailey—Alabama Polytechnic Inst. Sponsor: J. C. Farrow.

Hugh W. Barrow—Alabama Polytechnic Inst. Sponsor: J. C. Farrow.

Rama M. Ellis, Jr.—Alabama Polytechnic Inst. Sponsor: J. C. Farrow.

Truman E. Thomas—Alabama Polytechnic Inst. Sponsor: J. C. Farrow.

Hosea V. Atkinson—Georgia Inst. of Technology. Sponsor: C. A. Jones.

Walter C. Champion—Georgia Inst. of Technology. Sponsor: C. A. Jones.

George A. Wright, III—Georgia Inst. of Technology. Sponsor: C. A. Jones.

Bertram Blechman—Philadelphia Textile Inst. Sponsor: P. Theel.

Charles J. Kokron—Philadelphia Textile Inst. Sponsor: P. Theel.

James E. Norton—Philadelphia Textile Inst. Sponsor: P. Theel.

Mary E. Boys—Rhode Island School of Design. Sponsor: H. B. Sturtevant.

Roland R. Brassard—Rhode Island School of Design. Sponsor: H. B. Sturtevant.

Leonard Weissbein—Rhode Island School of Design. Sponsor: H. B. Sturtevant.

Georges Desnoyers—St. Hyacinthe Textile School. Sponsor: G. R. Boule.

James H. Kennedy, III—Mass. Inst. of Technology. Sponsor: E. R. Schwarz.

James P. Morgan—North Carolina State College. Sponsor: H. A. Rutherford.

Remzi Pensoy—North Carolina State College. Sponsor: H. A. Rutherford.

Edward Arnold—Lowell Textile Inst. Sponsor: E. E. Fickett.

David H. Abrahams—Lowell Textile Inst. Sponsor: E. E. Fickett.

George L. Baxter—Lowell Textile Inst. Sponsor: E. E. Fickett.

Howard C. Cobin—Lowell Textile Inst. Sponsor: E. E. Fickett.

William M. Copley—Lowell Textile Inst. Sponsor: E. E. Fickett.

Harry J. Demas—Lowell Textile Inst. Sponsor: E. E. Fickett.

Harvey M. Fishman—Lowell Textile Inst. Sponsor: E. E. Fickett.

Milton H. Gladstone—Lowell Textile Inst. Sponsor: E. E. Fickett.

Robert M. Greenberg—Lowell Textile Inst. Sponsor: E. E. Fickett.

George A. Scagos—Lowell Textile Inst. Sponsor: E. E. Fickett.

Robert L. Wilkey—Bradford Durfee Tech. Inst. Sponsor: J. Watters.

George C. Aumick—New York State Inst. of Applied Arts & Sciences. Sponsor: L. A. Henry.

Louis A. Bein—New York State Inst. of Applied Arts & Sciences. Sponsor: L. A. Henry.

Remo M. Bonifazi—New York State Inst. of Applied Arts & Sciences. Sponsor: L. A. Henry.

John A. Caradonna—New York State Inst. of Applied Arts & Sciences. Sponsor: L. A. Henry.

CALENDAR

COUNCIL

Meetings: June 9 (Montreal, Que.) Sept. 28-30 (Portsmouth, N. H. Convention) Nov. 17 (New York).

NATIONAL CONVENTIONS

1950: September 26 to 30, Portsmouth, N. H
1951: October 18 to 20, Statler, New York
1952: Boston.

HUDSON-MOHAWK SECTION

Meetings: May 19 (General Aniline Works, Renssalaer, N. Y.), June 23 (Annual Outing, Shaker Ridge Country Club, Albany, N. Y.), Sept. 15 (Albany), Oct. 20 (Utica), Dec. 8 (Albany), Jan. 19, 1951 (Albany), Mar. 16, 1951 (Albany), May 11, 1951 (Albany), June 22, 1951 (Annual Outing).

MID-WEST SECTION

Meeting: May 6 (Schroeder Hotel, Milwaukee, Wisc.), June 17—Annual Outing—Lake Lawn Lodge, Delavan, Wisc., October 28—Chicago, Ill.

NEW YORK SECTION

Meetings: May 5 (Kohler's Swiss Chalet, Rochelle Park, N. J.), June 16—Outing.

NORTHERN NEW ENGLAND SECTION

Meeting: May 19 (Merrimac C. C., Methuen, Mass.).

PHILADELPHIA SECTION

Meetings: May 5 (Kugler's, Philadelphia), June 9 (Annual Outing, Torresdale-Frankford Country Club, Philadelphia), October 28 (Meeting-in-Miniature, Philadelphia Textile Institute), December 8, January 17, 1951.

PHILADELPHIA TEXTILE INSTITUTE STUDENT CHAPTER

Meeting: May 24.

PIEDMONT SECTION

Meetings: June 30-July 1 (Ocean Forest Hotel, Myrtle Beach, S. C.), October 28 (Charlotte, N. C.)

RESEARCH COMMITTEE

Meetings: June 9 (Montreal, Que.), Sept. (Portsmouth, N. H., Convention), Nov. 17 (New York).

RHODE ISLAND SECTION

Meetings: May 26 (Johnson's Commodore Room, Providence, R. I.) October 27 (Providence Engineering Society Hall) November 17 (Johnson's Commodore Room).

SOUTH CENTRAL SECTION

Meetings: May 20 (Hotel Patten, Chattanooga, Tenn.) August 18-19 (Summer Outing—Read House—Hotel Patten, Chattanooga Country Club—Chattanooga, Tenn.).

SOUTHEASTERN SECTION

Meetings: May 27 (Columbus, Ga.), Sept 23 (LaGrange, Ga.) Dec. 9 (Atlanta, Ga.).

WESTERN NEW ENGLAND SECTION

Meetings: May 26 (Waverly Inn, Cheshire, Conn.) June 23 (Outing at Wallingford, Conn. Country Club).

TRADE NOTES • NEW PRODUCTS

Tagliabue Recorder and Humidity Controller

• New Tag Instrument

An instrument which records and automatically controls humidity has been announced by the Western Electrical Instrument Corporation, 614 Frelinghuysen Avenue, Newark 5, N. J., manufacturer of Tagliabue and Weston instruments. Utilizing the psychrometric wet and dry bulb principle, the controller automatically regulates the wet-bulb (relative-humidity) depression for which it is set, regardless of fluctuations in the dry-bulb temperature.

Two pens operate on a circular 10-inch chart, simultaneously recording the dry-bulb temperature and the wet-bulb depression. The flow of the humidifying agent, moisture, steam or oil fog, is regulated by a valve which is operated by the control instrument. Tagliabue developed this control system for all process industries and utilities requiring precise humidity control. For applications involving gas, such as the saturation of natural gas in the main, bars can be clamped on the case of the instrument, to make it gas-tight. Descriptive literature is available from the Weston company.

• Helmus to Head "Council" Committee

The Board of Directors of the Silk & Rayon Printers & Dyers Association of America has appointed a "public relations" committee headed by Weldon G. Helmus, vice-president of the Fair Lawn Finishing Company, Fair Lawn, N. J. to study ways and means of furthering establishment of an inclusive council for the rayon industry according to a report by Howard J. Fletcher, executive vice-president of the association.

The main functions of the committee at the outset will be to draw plans for bringing the functions of dyers, printers and finishers in contributing quality to fabrics and garments to the public attention.

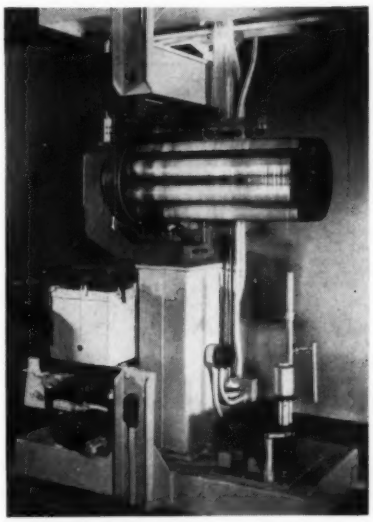
Joseph Seyer of Seyer Silk Dyeing & Finishing Company, Chairman of the Board of the association, will act as vice-chairman of the committee. Members include Fred Kern of F. P. Maupai Dyeing Co., association director, and V. C. McCollum, president of the Allentown Converting Works. Dean Lewis of Colonial Piece Dye Works, association president, and Mr. Fletcher are members ex-officio. David L. Benetar of Nordlinger, Riegelman & Benetar, association counsel, and Joseph F. Wildebush, association industrial relations director, will serve in advisory capacities.

• TRI Organizational Moves

The over-all direction of all operational functions of Textile Research Institute, Inc. has been vested in the Director of Research, Dr. John H. Dillon, it was announced by A. G. Ashcroft, President of the Institute. Certain functions of the New York office will be transferred to Princeton. The Publications Department will continue in New York under Julian S. Jacobs as Director, who also will be in charge of the New York office. Financial control and final policy decisions will remain with the elected officers and members of the Board of Directors.

"This move," said Mr. Ashcroft, "is in line with the Institute's policy of gradual development of the organization to keep pace with its steady growth and increase in scope of activities. In addition to organizational soundness, the plan offers definite possibilities of improved efficiency and economy of operations."

This action is the result of the gradual development during the past two years of a pattern of organizational operation in which the several divisions of Institute activities have gradually been brought together into a team co-ordinating with the Research Department at Princeton under the direction of Dr. Dillon. He will maintain the present close association between the Institute and Princeton University, of which he is a member of the faculty in the Department of Chemistry, and will continue as Director of Research of The Textile Foundation and of the Institute. Assumption of the new duties by Dr. Dillon will necessarily emphasize the role of Dr. James H. Wakelin as Associate Director of Research.



Kuljian Continuous Rayon Spinning and Processing Machine

• New Rayon Machine

A new continuous rayon spinning and processing machine is ready to be placed on the market by its inventor, Harry A. Kuljian, a Philadelphia engineer.

The most startling reports on the Kuljian machine state that a process which now takes from four to five days by the customary "pot-spinning" method—from the viscose solution to the finished yarn on the bobbin—is completed in 3½ minutes.

The finished yarn is said to be more uniform, of superior quality, better for dyeing, and easily adapted by simple controls to any desired combination of properties for varying types of yarn to meet specific needs.

The versatile new machine can reportedly produce a filament finer than one denier and with a few changes, turn out automobile tire cord of the toughest quality.

The machine aims toward lower prices on all products using rayon—including automobile tires. The inventor claims the following money-saving advantages for it: less capital investment, less plant, less time for installation, cheaper maintenance, lower production cost, less handling, greater output per spindle, elimination of damaged yarn, higher quality yarn at less cost, quicker change-over for varying types of yarn, less cost and less trouble for plant expansion, and more efficiency in the subsequent stages of manufacture of rayon products.

The machine is reported especially

adaptable for use in existing rayon manufacturing plants currently producing yarn or staple fiber, if it is desired to change such production to continuous filament yarn. By coupling the Kuljian Machine to present viscose-producing equipment, continuous filament yarn can be produced, it is stated.

Working with Mr. Kuljian, a staff of chemical engineers, mechanical engineers and experienced specialists in rayon manufacturing and application, have tested and improved this machine for several years. As a result of their efforts, a pilot plant demonstrating the Kuljian process is now operating in the Kuljian Corporation's headquarters in Philadedphia. An invitation is extended to interested parties to visit the plant at any time.

The Kuljian machine will continuously spin and process yarn in one operation from the coagulating bath to the packaged yarn for the textile trade, it is reported. As each machine is a complete, continuous spinning and processing unit in its entirety, multiples may be arranged in the plant in "banks", according to the available area for practical operation.

Inquiries for further information should be addressed to The Kuljian Corporation, 1200 North Broad Street, Philadelphia 21, Pennsylvania.

• Du Pont Film Department Appointment

The appointment of Arlington Kunsman as assistant general manager of the Du Pont Company's newly-created Film Department has been announced by Donald F. Carpenter, recently designated general manager. Mr. Kunsman, who is presently manager of the Cellophane Division of the company's Rayon Department, assumed his new duties when the new department was activated on April 1.

Mr. Kunsman, a native of Flicksville, Pa., was graduated from The Pennsylvania State College in 1916 with a bachelor of science degree in chemistry. He went to work for Du Pont as a chemist at the Carney's Point, N. J., smokeless powder plant.

The Film Department reportedly will be the primary agency in the Du Pont Company for handling non-photographic film, including plain and moistureproof cellophane, cellulose acetate film, polythene film, cellulose sponges and sponge yarn, and "Cel-O-Seal" cellulose bands.

• Publications of the N.B.S.

The following are publications of the National Bureau of Standards. Copies may be obtained at listed prices from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

RP2038

Physical Properties of Sixty API-NBS Hydrocarbons, Alphonse F. Forziati and Frederick D. Rossini, 4 pp., 5 cents. The results of measurements of refractive index, density, and boiling point of 60 hydrocarbons are presented.

As part of the work of the American Petroleum Institute Research Project 6 on the fractionation, analysis, purification, and properties of hydrocarbons, measurements are being made of physical properties of the API - NBS series of highly purified hydrocarbons.

RP2031

Infrared Absorption Spectra of the Liquid Butenes and 1,3-Butadiene, E. Garroll Creitz and Francis A. Smith, 11 pp., 10 cents:—The spectra obtained from these samples provide data for the analysis of liquid plant streams by spectrometric methods.

The vapors were put under sufficient pressure to liquefy them at room temperature. Spectra of the same samples in the vapor phase have been recorded and presented for comparison.

• United States Testing Certified Laboratory of N.S.T.C.

The United States Testing Company, Inc., Hoboken, N. J., announces that it has met the requirements of the National Safe Transit Committee and has been appointed a "Certified Laboratory" by this group, which is sponsored by the Porcelain Enamel Institute, Washington, D. C.

The National Safe Transit Committee was established for the purpose of initiating a practical program for reducing damage to packaged artcles during handling and while in transit. The problems of vibration and impact have long been a source of concern to American industries. Now manufacturers in the East have available the services of a modern well equipped laboratory that is able to conduct all tests prescribed by the Safe Transit Committee's Projects I and IA, the company states.

The United States Testing Company also offers a consultation service to provide recommendations for the improvement of packaging and packaging materials to meet the National Safe Transit Committee's shipping requirements.

• PTI Alumni "Cruise"

The Forty-Ninth Annual "Cruise" of the Alumni Association of the Philadelphia Textile Institute will be held Friday, June 2, 1950 at the Manufacturers' Golf and Country Club, Oreland, Montgomery County, Pa. Annual meeting 11:00 A.M. Dinner 7:00 P.M. D.S.T.

William H. Hughes

• PTI Department Head

Professor William H. Hughes, former Athletic Director, has been appointed head of the Chemistry and Dyeing Department at Philadelphia Textile Institute, succeeding Professor Percival Theel who has been appointed Coordinator of Research.

Professor Hughes is a graduate of the University of Pennsylvania and the Philadelphia College of Pharmacy and Science. At various times he held teaching positions at these schools as well as Drexel. He was associated with the Philadelphia Quartermaster Depot and held positions as a petroleum engineer. He joined PTI in 1944. Professor Hughes is a member of the American Chemical Society, having served as chairman of several committees of the Philadelphia Section and a member of the Micro-chemical and Analytical Division, serving as Director of the Philadelphia group. Other memberships include A.A.T.C.C., Alpha Chi Sigma, Phi Delta Chi, Phi Psi, and the Engineers Club of Philadelphia.

• Hardesty Co. Appoints New Representative

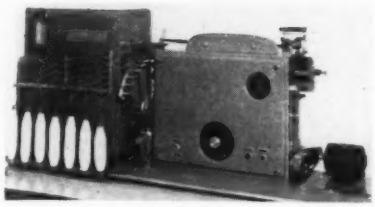
W. C. Hardesty Co., Inc., manufacturers of fatty acid products, have announced the appointment of William E. Phillips, Inc., as their Chicago representative. W. C. Hardesty Co., Inc., will continue to carry warehouse stocks in Chicago from which deliveries can be made immediately.

• Caustic Soda Booklet

"Mathieson Caustic Soda," a new 48-page book, is now available to caustic users throughout the industry.

Fully illustrated and printed in two colors, it covers phases connected with the manufacture, economics, properties, handling and application of this product.

Requests for the book should be addressed to Mathieson Chemical Corporation, Mathieson Building, Baltimore 3, Maryland.



Autodynamograph Breaking Strength Tester

• Automatic Yarn Testing and Recording

American Textile Engineering, Inc., Arlington, N. J., has announced the "Autodinamografo", an automatic yarn testing and recording machine for breaking strength and elongation. The Autodinamonografo, once started, will make 70 tests from 7 different bobbins and record each of them, it is stated. Furthermore, after the machine stops at the completion of the 70th test the chart will reveal at a glance the average of the breaking strength of all seventy tests.

Once the Autodinamografo has been set in motion all further operations are reportedly performed automatically without the help of an operator. This newest testing device is said to give the highest possible accuracy, save many hours of time for the same number of tests and deliver simultaneously a written document of all seventy tests and their average.

The Autodinamografo will be shown in operation at the Textile Machinery Exhibition, booths No. 603-604.

• Theme of National Chemical Exposition

"A Half Century of Chemical Progress" will be the theme of the Sixth National Chemical Exposition sponsored by the Chicago Section of the American Chemical Society to be held in the Chicago Coliseum Sept. 5th thru 9th. According to Dr. Marvin C. Rogers, Director of Research for R. R. Donnelley & Sons, Chairman of the Exposition Committee, this theme will be carried out in all phases of the Exposition.

Among exhibits being planned are: the history of the development of those phases of chemistry which led to the release of atomic energy, the development of important industrial processes and equipment, the development of chemical research organizations and research instruments, and the birth and development of entirely new industries as a result of chemical research.

Educational features will include an exhibit of chemical text books, biographies and scientific contributions of outstanding chemists of the first half of the twentieth century, and the growth of chemistry as a profession.

A continuous showing of industrial movies will be held as well as "Chemical Trail Blazers". These displays reveal the latest discoveries, ideas, applications, and developments in the chemical field. However, encouragement will be given to exhibits which also conform to the half century of chemical progress theme.

• Truslow New U. S. Rubber Supervisor

Neal Truslow has been appointed supervisor of product development for United States Rubber Company's textile division development department, it was announced by S. H. Sherman, development manager of the company's textile division.

Mr. Truslow, a native of Chestertown, Md., is a graduate of Johns Hopkins University in chemical engineering and was formerly with Chicopee Manufacturing Corporation, where he was engaged in textile research. He is a member of the American Institute of Chemical Engineering and the American Association of Textile Chemists and Colorists.

He will have his headquarters at the company's new textile research laboratories in Winnsboro, S. C., which will open in the near future and will be responsible for the textile division's new product development other than Asbeston. His duties will also include the direction of the chemical laboratory at Winnsboro.

• Clark Thread Fellowship Awards

Three Fellowships for graduate study and research in the field of textile technology are being offered to holders of Bachelor's Degrees from accredited schools in Chemical Engineering and other branches of science. The awards are made on the basis of academic performance and professional promise. Winners receive $1800 per academic year which will pay for tuition and a large share of living expenses at The Massachusetts Institute of Technology.

The Clark Thread Company makes these awards available to stimulate an interest in technical training to supply the need for scientifically trained personnel for the thread industry of the United States.

Winners of 1949 Fellowship awards are: J. H. O'Neill, Jr. who is a candidate for Doctor of Science Degree in Chemical Engineering, S. Backer who is pursuing work leading to a Doctorate of Science Degree in Mechanical Engineering, and R. E. Seaman who is working under a special faculty committee toward a Doctor of Science Degree in the field of Fibrous High Polymers.

Inquiries may be sent to Dean of the Graduate School, Massachusetts Institute of Technology, Cambridge, Massachusetts.

Reeve K. Biggers

• Biggers Appointed Sales Manager

Appointment of Reeve K. Biggers as sales manager of the Fiberglas Textile Products Division, has been announced by J. H. Thomas, vice president of Owens-Corning Fiberglas Corporation and general manager of the Textile Products Division, 16 East 56th Street. The position had been unfilled since the division was created a year ago.

Mr. Biggers joined Owens-Corning Fiberglas Corporation in 1946, following graduation from Yale University and four years service in the U. S. Navy where he attained the rank of Lieutenant Commander.

Mr. Thomas also announced the promotion of Fred F. Sampson, Jr., as manager of the Electrical Sales Division and the appointment of Richard J. Lasko as manager of electrical apparatus sales, and George H. Sherrard as manager of wire and cable insulation sales.

Ludlow King was named to succeed Mr. Biggers as manager of the Fiberglas Washington office, according to an announcement in Toledo by Ben S. Wright, vice president and general sales manager. Mr. King, a West Point graduate and formerly a lieutenant colonel in the Chemical Warfare Service, since 1945 has been a member of the Fiberglas sales staff in Washington, where he served as manager of services to the federal government. He will continue in that capacity, in addition to his new duties as Washington branch manager.

• Warrington Appointed by Turbo

Turbo Machine Company, Lansdale, Pa., manufacturers of boarding and preboarding equipment, have announced the appointment of F. W. Warrington Co., Charlotte, N. C., as their Southern Representative. F. W. Warrington and George Dudley, of the latter firm, recently spent several days studying manufacturing operations at the Turbo plant in Lansdale.

• International Chemical Conclave

Outstanding chemists and chemical engineers from more than thirty countries will assemble in New York in September, 1951, to participate in the largest international chemical conclave in history, it is announced by Dr. Ernest H. Volwiler, president of the American Chemical Society, which will celebrate its diamond jubilee at that time.

Both the Sixteenth Conference of the International Union of Pure and Applied Chemistry and the Twelfth International Congress of Pure and Applied Chemistry will convene following the seventy-fifth anniversary meeting of the American Chemical Society, scheduled for the week of September 2, according to Dr. Volwiler, who is executive vice-president of Abbott Laboratories, North Chicago, Ill.

At the 1951 meeting, the Union will meet in New York on September 8 and 9, and in Washington on September 14 and 15, as well as September 16 if necessary. The Washington session will enable the delegates to take part in the fiftieth anniversary celebration of the founding of the National Bureau of Standards.

The Twelfth International Congress of Pure and Applied Chemistry, to be held in New York September 10 through 13, 1951, will be of special importance because it will be the first postwar meeting at which the full development of wartime and early postwar research can be discussed.

This combination of international meetings will be the first of its kind in the United States since 1912, although the International Union met in Washington in 1926 when the American Chemical Society marked its golden jubilee.

Dr. James Bryant Conant, president of Harvard University and a former professor of chemistry there, has been named honorary president of the Twelfth International Congress, at which world progress in every field of chemical science and technology will be reported. The Congress is held every four years to enable leaders in the various branches of chemistry and chemical engineering to exchange information.

The International Union, which meets every two years to set uniform chemical standards for scientists and engineers throughout the world, will decide questions of nomenclature, atomic weights, and the like. Dr. Hugo R. Kruyt of The Hague, The Netherlands, is president of the Union.

Professor Arthur B. Lamb of Harvard, recently retired editor of the *Journal of the American Chemical Society*, has been appointed chairman of the committee on organization for both the Congress and the International Union meeting. The two international sessions will be sponsored by the Division of Chemistry and Chemical Technology, National Research Council, of which Professor D. Albert Noyes Jr. of the University of Rochester is chairman.

Dr. Harry L. Fisher, retired director of organic chemical research for U. S. Industrial Chemicals, Inc., has been placed in active charge of planning for the meetings as an administrative assistant in the Division of Chemistry and Chemical Technology, with offices in the National Academy of Sciences Building in Washington.

Other members of the Committee on Organization are Gaston DuBois of St. Louis, retired vice-president of the Monsanto Chemical Company; Dr. Gustav Egloff of Chicago, director of research of the Universal Oil Products Company; Dr. Walter J. Murphy of Washington, American Chemical Society editor; Dr. Foster D. Snell of New York, president of Foster D. Snell, Inc., and Dr. Edward R. Weidlein of Pittsburgh, director of the Mellon Institute of Industrial Research.

A $250,000 drive has been launched by a special finance committee headed by Dr. Weidlein to help meet the costs of the American Chemical Society jubilee program and the international meetings, which are expected to exceed considerably the money obtained from registration fees.

Assisting Dr. Weidlein in the $250,000 appeal are Dr. Gustavus J. Esselen of Boston, president of the Esselen Research Corporation; Dr. Harry B. McClure of New York, vice-president of the Carbide and Carbon Chemicals Corporation; Walter A. Schmidt of Los Angeles, president of the Western Precipitation Corporation, and Dr. Charles Allen Thomas of St. Louis, executive vice-president of the Monsanto Chemical Society and chairman of the Board of Directors of the American Chemical Society.

Many of the visiting chemists and chemical engineers will attend the diamond jubilee meeting of the American Chemical Society, which will be the Society's 120th national meeting. Colorful ceremonies at which the foreign representatives will present greetings from their own national societies will form an important part of the jubilee program.

• Leather Department at Lowell Textile

A Department of Leather Engineering has been established at Lowell Textile Institute and will be ready to admit students in September 1950.

In announcing the inauguration of the new course, Kenneth R. Fox, President of the Institute, made known that the project had been in the planning stage for several years due to the fact that the school is located in an area where the leather industry has become an important economic factor and has consequently offered excellent opportunities to men properly equipped with thorough and systematic training in the field of Leather Technology.

The new department will be under the supervision of Dr. Albert E. Chouinard, who received the B.S. and M.S. degrees from Holy Cross College and became a Ph.D. at Clark University in 1946. Before entering the educational field at Lowell Textile Institute, Dr. Chouinard was in charge of product development and testing for a Worcester, Massachusetts leather tanning company.

The building which will contain the new department is now under construction and is expected to be completed in 1951. One entire floor will reportedly provide space for specialized facilities for the study of leather processing with the laboratories devoted to research and practical demonstrations in the field of leather. The space provided in the new building, as well as facilities already existing at the Institute, will provide adequately for the needs of the department, it is stated.

In formulating the engineering curricula, emphasis will be placed on the fundamentals of engineering, including mathematics, physics, chemistry and theoretical and applied mechanics. In addition to training in the principles of leather technology, social sciences and the methods of business organization and administration will be studied.

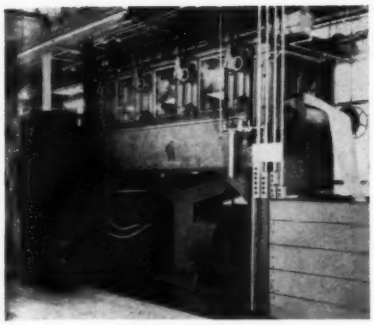
• HRL Additions

Harris Research Laboratories announces the addition to its staff of Paul E. Ritt, a graduate in chemistry of Loyola College, and John L. Worden, who has a degree in chemical engineering from Notre Dame.

• Hooker Promotes Edwards

John P. Edwards has been named supervisor of product application by the Hooker Electrochemical Company, Niagara Falls, N. Y. Greater emphasis is being placed on the development of uses for new products and new applications of old products for the chemical and allied industries. In his new capacity Mr. Edwards will coordinate activities of research and sales in this direction.

Mr. Edwards, a chemical engineer, was graduated from the University of Minnesota in 1940, and since coming to the Hooker Company that year, has been associated with the process study group and more recently with the sales development department.



R. & L. Continuous Crusher

• Improved Continuous Crusher

The development of a completely redesigned and improved continuous crusher for "dusting" or "crushing" woolens has been announced by Riggs and Lombard, Inc., Lowell, Mass.

The machine consists of two units, set up on tandem, each equipped with four sets of metal rolls, the bottom ones being knurled. Top roll pressure is applied through coil springs, controlled by pneumatic cylinders. This is said to assure ease of operation and uniform pressure from roll to roll. Extremely rigid construction and the arrangement of moving parts are said to practically eliminate vibration.

Both units are enclosed and equipped with large capacity fans located directly beneath to insure complete exhaustion of dust. At all times the machine operator is able to see inside through easily removable lucite panels, it is stated. Each unit is driven by a 20 h.p. motor through a roller chain and sprockets. By means of a single electrical control, the forward and reverse cycles can be adjusted for the desired production speed or to synchronize with the speed of a carbonizing range, the company states.

Model CCT-4, the dual-unit continuous crusher, and Model CCS-4, which is a single unit, can be installed in connection with existing carbonizing ranges, as well as new ranges.

• Colgate-Palmolive-Peet Appointments

Hugh R. MacMillan, Jr., Vice-President in charge of Production at the Colgate-Palmolive-Peet Company has announced the appointment of Leo A. Scott as General Superintendent of Domestic Plants.

At the same time, Mr. MacMillan also announced the appointment of Joseph G. Ferraro as Jersey City Plant Superintendent.

Mr. Scott, of Ridgewood, N. J., joined the Colgate-Palmolive-Peet Company as a chemist in the Kansas City, Kan. plant in 1931 and was transferred to the Jersey City Plant's Production Standards Department in 1935. He became successively Production Supervisor and Plant Superintendent before his new appointment.

Mr. Ferraro, of River Edge, N. J., became associated with the Colgate-Palmolive-Peet Company in 1934 as a Laboratory Technician. Since then he has held the positions of Toilet Article Supervisor and, prior to this new appointment, Production Supervisor.

• Conference on Electric Applications

Use in the textile field of new scientific and engineering developments were reported and discussed at a two-day conference held April 13-14 at the Georgia Institute of Technology, Atlanta, Ga.

Called the "Conference on Electrical Applications for the Textile Industry," the meeting was conducted jointly by the American Institute of Electrical Engineers' Textile Committee, and the Engineering Extension Division Georgia Institute of Technology.

The subjects discussed included applications of electronics, air conditioning, proper lighting, use and misuse of electrical machinery in the industry, etc.

Dr. H. A. Dickert, director of the A. French Textile School of Georgia Tech, addressed the visiting engineers at a luncheon the first day of the conference. Presentation of technical papers relating to the textile industry, symposiums and demonstrations featured the two-day program.

Speakers and their subjects were: Swaffield Cowan, Factory Insurance Association, Charlotte, N. C., "Recommended Good Practice for Selecting and Installing Electrical Equipment in Textile Mills"; W. H. Behnke, Reliance Electric & Engineering Co., Cleveland, Ohio, "Packaged Drives in the Textile Industry"; J. G. Stephenson, Textile Application Engineer, Westinghouse Electric Corp., Atlanta, "Slasher Drives Up-To-Date"; R. R. Lang, Textile Application Engineer, General Electric Co., Schenectady, N. Y., "Standardization of Range Drives for Textile Finishing"; H. S. Colbath, Plant Engineer, Bibb Manufacturing Co., Macon, Ga., "A Completely Air Conditioned Mill"; Frank E. Keener, of Decatur, Ga., "Forty Years of Textile Lighting"; A. T. Bacheler, Textile Application Engineer, Westinghouse Electric Corp., East Pittsburgh, Pa., "Electronics in the Textile Industry"; W. L. Butler, Control Engineering Division, and R. J. Demartini, Textile Application Engineer, both of General Electric Co., Schenectady, "The Hysteresis Yarn Tension Device," and Dan McConnell, Plant Engineer, Cone Mills Corp., Greensboro, N. C., "Connecting Power Wiring."

The conference was under the chairmanship of Harry Uhl, of Avondale Mills, Sylacauga, Ala.

Much assistance was contributed to this conference by the Georgia Section of A.I.E.E.

• New De Paul Specialties

The De Paul Chemical Company, Inc., 44-27 Purvis St., Long Island City 1, N. Y. has announced new specialties. Inquiries on Depcosols, a new series of cationic softening agents, and Depcogel, a high quality detergent for general use wi h all natural and synthetic fibers, are invited. The manufacturer's descriptions follow.

Depcogel is a clear-amber gell with a neutral reaction $C_{17}H_{33}CO.N.(CH_3)C_2H_4$-$SO_3Na$. This structure imparts high stability to boiling solutions of caustic and mineral spirits. It is readily soluble in hot and cold water and is quick-rinsing.

Depcogel produces brilliantly clear solutions with rapid wetting and high foaming powers which are not affected by the severest hardness conditions. It will, therefore, maintain its full detergent power under all chemical conditions.

The high quality of Depcogel makes it economical for all detergent uses, and its outstanding properties make it especially interesting where unusual conditions of hardness, acidity of alkalinity are a problem.

Depcosols show unique and unusual properties on natural and synthetic fibers.

This process was recently developed in the laboratory and is characterized by outstanding resistance to discoloration—yellowing. They also have excellent resistance to washing and dry-cleaning and tests have indicated that they increase the light and wash fastness of dyes in many instances.

Depcosols may be used in conjunction with many other resins and finishing agents as they are efficient in a wide variety of pH insofar as to allow the applications from acid, neutral or alkaline solutions. The stability temperature is above that of the usual processing temperatures.

The process by which Depcosols are manufactured is so unique that it is possible to "custom-build" a finish with desired properties for many specific applications.

• 1950 Canadian Textile Seminar

The Second Canadian Textile Seminar will take place at Queen's University, Kingston, Ontario, on Friday and Saturday, September 15th and 16th, 1950.

I. D. Ritchie, Development Manager,

Nylon Division, Canadian Industries Ltd., Kingston, who is Secretary-Treasurer of the Seminar 1950, has arranged accommodations in College residences and in Kingston hotels.

Among papers being sponsored by the various constituent bodies of the Federation are the following: Textile Society of Canada (Eastern Division), "Mill Supervision"; Textile Society of Canada (Western Division), "Knitting, Worsted Manufacture"; Canadian Association of Textile Colourists & Chemists (Ontario Section), "Dyeing & Finishing of Wool"; Canadian Association of Textile Colorists & Chemists (Quebec Section), "Dyeing, Finishing and Related Processes of Cotton & Man-Made Fibers"; Ottawa Valley Textile Association, "Woolen Manufacture"; Cornwall & District Textile Association, "Man-Made Fibers and Related Processes."

The Federation has formed a liaison committee with the Canadian Institute of Chemistry, and other papers will be sponsord by the following groups: Canadian Institute of Chemistry, "Papers at Fundamental Research Level on Related Textile Subjects"; The Wool Bureau, The American Association of Textile Chemists & Colorists.

Forty papers have been arranged for by the committee chairmen: "Mill Supervision, H. Fisher, Dominion Textile Co. Ltd., Montreal, Quebec; "Knitting," L. Borsook, Dorothea Knitting Mills Ltd., Toronto, Ontario; "Worsted," E. A. Black, York Knitting Mills Ltd., Toronto, Ontario; "Woolen," K. Dunlap, Kenwood Mills, Arnprior, Ontario; "Man-Made Fibers," J. E. Kelly, Courtaulds (Canada) Limited, Cornwall, Ontario; "Wool Dyeing, etc.," G. Farley, Guelph Yarn Ltd., Guelph, Ontario; "Cotton & Man-Made Fibers, Dyeing, etc.," G. Smiley, Magog Print Works, Dominion Textile Co., Ltd., Magog, Quebec; "Fundamental Research Papers," C. H. Bayley, National Research Foundation, Ottawa, Ontario.

Additional committees are: "Film Exhibition," R. B. Weatherston, Sandoz Chemical Works Ltd., Toronto, Ontario; "Reception Committee," George Holloway, Dye & Chemical Co., Kingston, Ontario; William Jackson, Jr., Scholler Bros., St. Catharines, Ontario and Jack Westaway, W. J. Westaway Co. Ltd., Hamilton, Ontario; "Reception Committee for Visitors to Canada," James Clough, Clough Chemical Co. Ltd., Montreal, Quebec; "Printing," Roy Keyes, Canadian Textile Journal; "Publicity," William King, Canadian Textile Journal.

Registration will take place Thursday evening, September 14, and the following morning. The Seminar will start at 9 a.m. Friday, September 15, and end at 4 p.m. on Saturday. There will be a dinner in Grant Hall on the Friday evening, at which The Textile Technical Federation of Canada Medal will be awarded for the first time and a special speaker will be the guest of honor.

• New Sarco Bulletins

Sarco Company, Inc., 350 Fifth Avenue, New York 1, N. Y. has announced the availability of bulletins specifically produced for the wet-processing industry. Bulletin 2 tells how to reduce warming-up time on slashers, dry cans and other textile dryers. It describes the new Sarco system of air venting and draining rotating cylinders.

Special Bulletins S-1336 and S-1283 explain how uniform results can be assured if the process is temperature controlled. The new Sarco regulator with electric pilot has an indicating thermostat on which settings are easily changed by turning a knob.

• Instrument Course

The third quarterly instrumentation course for 1950 will be held July 10-14 at the Hatboro, Pennsylvania plant of the Fischer & Porter Company.

Manufacture, calibration, installation, operation and maintenance of flow (variable-area and orifice), liquid level, specific gravity and viscosity instruments will be covered.

Additional information can be obtained by writing to the Fischer & Porter Company, East County Line Road, Hatboro, Pennsylvania.

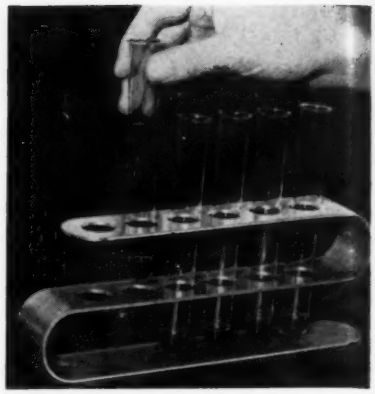
• Chatham Appoints Smith

Chatham Manufacturing Company has recently appointed Arthur L. Smith as Technical Director. The company is in the process of expanding the laboratories and technical service.

• "Industrial Control Devices"

"Industrial Control Devices" for temperature, flow, pressure, liquid level and humidity, Catalog 8303, has just been published by the Minneapolis-Honeywell Regulator Co., Industrial Division, Wayne and Windrim Aves., Philadelphia 44, Pa. The 64-page catalog presents over 100 different models of non-indicating electric, electronic, and pneumatic controllers.

A number of additions to the previous line are shown for the first time, including electronic temperature controllers, self-contained electric temperature controllers, and pneumatic insertion type temperature controllers; magnetic starters and contactors; heavy-duty pneumatic positioning motors; pneumatic automatic reset relays and electric step controllers.



Fisher S-Shape Aluminum Test Tube Rack

• Aluminum Test Tube Rack

The old wooden test tube rack is giving way to modernization after specialized treatment by the design engineer.

The modern prototype of the old laboratory tool is the Fisher S-Shape Aluminum Test Tube Rack, manufactured by the Fisher Scientific Co., 717 Forbes St., Pittsburgh 19, Penna. It consists simply of a single piece of heavy anodized aluminum sheeting bent in the shape of a flat letter "S" and drilled with holes to accommodate up to six test tubes of 4 inches in height or more, and up to 7/8 inch in diameter. It is covered by a pending patent.

The corrosion-resistant metal construction is reported far superior to wood because it will not crack, break, split, sag, swell or pull apart. It can even be used in hot air ovens, autoclaves and other equipment where it may be subjected to unusual conditions of temperature, moisture or corrosion, the company states.

• National Starch to Handle A-H Dextrine Line

Arnold, Hoffman & Company, Inc., Providence, R. I., has selected National Starch Products, Inc., New York, N. Y. to manufacture and sell their present line of Dextrines to the textile industry.

In making this announcement, Edwin H. Arnold, President, stated that this decision was made only after several years consideration. He felt that National Starch Products, Inc. was in the best possible situation geographically to manufacture and service present Arnold, Hoffman & Company, Inc. customers.

This decision brings together Arnold, Hoffman & Company, the second oldest chemical house in this country, having been established in 1815, and National Starch Products, Inc., a leading manufacturer of starch specialties, with plants located throughout the United States, and in Canada, England, and Holland.

Electrostatic Voltmeter

• Instrument Locates Statistically Charged Areas

An Electrostatic Voltmeter, originally developed by the Institute of Textile Technology, is now being manufactured under license from the Institute by Specialties, Inc., of Syosset, N. Y. Designed to locate areas of static electricity in textile plants, custom built models of the instrument are said to have been used successfully by Institute member mills for over a year, with resulting demand for a production model. The Specialties Electrostatic Voltmeter provides an indication of the amount of electrical charge on moving or stationary equipment or materials. The presence of these charges at many stages in textile processing frequently slows production and constitutes a fire hazard. Preventive steps can be taken without guesswork when relative charges for various areas are determined by means of the Electrostatic Voltmeter, it is stated.

This sturdy, portable instrument (weight 3 pounds, 10 ounces) reportedly does not require technically trained personnel to make qualitative determinations. It is extremely sensitive, with provision made to permit reduction of sensitivity to one-tenth or one one-hundredth. Full sensitivity is employed for general area inspection, and the lesser snsitivities are said to permit close examination without sending the meter needle off scale. Those parts of the instrument most likely to be affected by moisture and lint are sealed. Power is self-contained. An accessible flashlight cell requires replacement about every six months. The balance of power is supplied by mercury type batteries.

• "Naf-Sol" Naphthol Solutions

Augusta Chemical Company, Augusta, Ga., has announced the production of "NAF-SOL", a new line of stabilized, highly-concentrated, ready-to-use stock solutions of Naphthols. Many leading dyers and printers now using them have reported better, clearer tones together with time and money savings.

The Company, manufacturers of Naphthols, B.O.N. and Sulfur Colors, states that they have a "NAF-SOL" for every Naphthol in the series. They further state that the delivered price of the solutions, on solid Naphthol content basis, is no more than for powdered Naphthols.

Aside from their economical advantages, these innovations in the Naphthol field look to be significant in regards to convenience and results. "NAF-SOL" is aimed at eliminating the usual messing with alcohol, caustic, wetting agents and the straining necessary when using powders, a saving of both time and material. The elimination of the usual sneezing, wheezing, eye-tearing or skin rashes associated with the use of powders is also claimed. The elimination of flocculation, particularly in ASSW, with its attending annoyance and losses, adds to the economy and time saving gained when "NAF-SOL" ASSW is used in place of Naphthol powder.

The company states that regular, uniform results are assured due to the products' dependable uniform concentration, and further, that the solutions are devoid of undissolved particles and will not precipitate out.

Reportedly, no further preparation is necessary and no change in procedure is required after "NAF-SOL" is added to the "sprung" bath to naphtholate in package dyeing, padding or raw stock. It is shipped in standard sized bung type drums which may be stored.

Patents have been applied for both the product and process.

Further information may be secured from the Augusta Chemical Co.

• 51st Reunion of L.T.I. Alumni

Lowell Textile Institute alumni will gather at the Hotel Vendome in Boston on Friday, May 12, for the fifty-first reunion. Registration headquarters will be in the hotel's Empire Room and guests will register between six and seven-thirty in the evening.

At seven-thirty, the alumni banquet will be held with Professor John R. Robertson acting as toastmaster. After dinner speakers will be Kenneth R. Fox '38, President of the Institute; William F. Brosnan '27, President of the Alumni Association; and the Honorable Paul A. Dever, Governor of Massachusetts.

On Saturday, May 13, the alumni will meet at the Institute between nine and ten o'clock in the morning and at ten o'clock a business meeting will be held and annual awards made. At eleven, President Fox will address the guests.

Following a noon luncheon there will be a baseball game between the Textile Institute's team and New England College.

Coleman Model 30 AC Line-Operated pH Meter

• Line Operated pH Meter

Coleman Instruments, Inc., Maywood, Illinois, has announced its new Model 30 AC line-operated pH Meter. Designed for operation at 95-130 volts, 50/60 cycles, this new instrument is reported of high stability and almost complete freedom from drift. Accuracy and reproducibility are said to be within 0.05 pH. It offers continuous, direct reading in pH or Millivolts and polarizing current for Karl Fischer Titrations.

The instrument, enclosed in a black stain-and-corrosion-proof plastic enclosure equipped with a storage well for protection of the electrodes, is said to be completely protected against high ambient humidity. A screw-base electrode system permits use of a variety of special purpose electrodes. Operation of the instrument has been simplified, making it practical for industrial plant-control applications as well as laboratory use, it is stated.

Ask for manufacturer's Bulletin B-222.

OBITUARY

J. HARRY ATKINSON

J. HARRY ATKINSON, chemist and technical representative of the Surpass Chemical Co., Inc., Albany, New York, died suddenly on March 13th at his home at Troy, New York, at the age of 70.

Mr. Atkinson was born in Philadelphia, Pa., and after finishing school, worked for many years in several dyehouses in the Philadelphia area.

He later moved to Utica, New York and became dyer for the Utica Steam Cotton Mills. During World War I, he was superintendent of dyeing and finishing for Wright's Underwear Company, Troy, New York.

He joined the Surpass Chemical Co., Inc. in 1920 and had been in their employ for the past thirty years.

Abstracts—

(Concluded from Page 291)

Special Dyeing of Cotton on the Seed Gives Visual Evidence of Changes During Fiber Development

C. F. Goldthwait, H. O. Smith, and F. T. Roberts, Textile Research J. 20, 100-4, Feb., 1950.

This is the second in a series of papers on a special method of dyeing cottons differentially to show differences between them. The main purpose of this work has been to develop techniques for identifying thin-walled (immature) cotton fibers, and for showing their amount and distribution in the presence of thick-walled (mature) fibers. Such special dyeing has proved useful to a number of cotton manufacturers and finishers in problems involving fiber-wall thickness. The present paper is an account of the use of differential dyeing in another way to furnish visual evidence of a fundamental submicroscopic change in cotton as it dries when the boll opens on the plant, and to indicate structural differences between thin- and thick-walled cotton fibers. The work contributes also toward the explanation of the differential-dyeing effect.—W.H.C.

Stabilization of Casein Fibers by Desamination

R. F. Peterson and R. L. McDowell, Textile Research J. 20, 95-9, Feb., 1950.

Casein fibers hardened with formaldehyde solutions need further processing to withstand boiling acid dye baths. Studies on desamination of casein fiber at various steps in the spinning process are reported. Desamination of casein fiber increases its resistance to dye baths. Desaminated fiber is given additional stability by treatment with acid-formaldehyde solutions followed by baking at 110°C. Dye uptake of both acidic and basic dyes is reduced by the combined treatment.

Acetylation has been used to stabilize the commercial casein fiber, but this process has serious deficiencies.—W.H.C.

Microbiological Deterioration of Cellulose During the First 72 Hours of Attack

E. Abrams, Textile Research J. 20, 71-86, Feb., 1950.

The results obtained in these experiments are as follows:

1. Determination was made of loss of tensile strength of cotton duck during the first 72 hrs. of incubation using 5 cellulolytic organisms—*Thielavia* sp., *Humicola* sp.,*Stemphylium* sp., *Chaetomium globosum,* and *Myrothecium verrucaria.*

2. A study of mildewed fibers in dilute alkali, suggested by Clegg's Congo red test, has shown the localized nature of attack by cellulolytic molds and the production of alkali-soluble material in the areas. As the attack proceeds, the cellulose becomes soluble in decreasing concentrations of alkali and finally becomes soluble in water.

3. In an attempt to identify the material in the alkali-soluble regions by infrared absorption, changes in cellulose films after partial digestion by *Chaetomium globosum* were studied by infrared absorption. No significant effects were found.

4. The following indirect methods for the identification of cellulose decomposition products were used:

(a) Study of the action of cellulolytic molds on sugars and sugar derivatives.

(b) Testing of cellulose derivatives (e.g., cellulose acetate).

5. Enzyme extracts from *Chaetomium globosum* digest degraded forms of cellulose but not native cotton fibers.—W.H.C.

The Place of Research in Textile Colleges

Kenneth R. Fox, Textile Research Journal 20, 132-135, February, 1950.

In considering the place of research in textile colleges, it should be made clear from the outset that, in my opinion, the primary objective of such institutions is educational. With this as a premise, then, it is necessary to consider the factors that have been introduced in the program of training young minds as they relate to educational requirements. Research is generally accepted as being one of these factors. It is felt by the textile colleges in America that research helps create an environment consistent with their recognized aim of providing technically trained personnel for the textile and allied industries.

There are a number of reasons why this philosophy has been adopted. First, research has been encouraged because of the salutary effect which such investigations have on the state of mind of both teacher and student. Research prompts numerous inquiries, and education can be more effective when an insatiable inquisitiveness has been created in the student's mind. It usually follows that an inquisitive mind is an open and eager mind.

Another reason for subscribing to the important role research can play in education is the apparent need to develop an appreciation for research in the minds of the future industrial leaders. The textile colleges have the unique opportunity through individual research assignments to develop the proper research point of view at an early stage in the lives of potential textile personnel.

Additionally, there is the obvious benefit that the textile industry receives in having textile problems investigated in its colleges. Much good work of direct application to the industry has resulted from these research programs.

It appears pertinent to point out a few of the methods that have been employed in America in establishing research programs. Perhaps the most obvious is the one in which teaching staff members are permitted and encouraged to undertake research assignments of their own choosing. As a matter of fact, many colleges determine faculty promotions on the basis of research accomplishments in addition to the more universally accepted criterion of good teaching.

Another method which has been employed to encourage research is the establishment of research departments which are more or less independent of the teaching staff. It has been found, too, that when their projects permit, these research workers make very valuable guest lecturers.

There are, in addition, several means available by which research can be accomplished at the student level. The first of these is the requirement prevalent in most colleges, whereby original or confirmatory research is required at the undergraduate level. To permit this, the curriculum is designed so that students have sufficient time to undertake to write theses in their final or senior year of undergraduate work. A similar plan is also employed at the graduate level—*i.e.,* beyond the bachelor's degree.

A few words should also be said concerning the type of research conducted in the American textile colleges. Projects undertaken by either students or staff range from the most basic, academic type to the most practical, objective type. I shall mention merely a few of the projects that have been undertaken; studies of fiber fineness; studies on the effect of twist on yarn and fabric properties; investigations of fabric structure; instrumentation studies of many different types; investigations on the various factors that affect uniformity of dyeing; evaluation of chemical assistants; development of new processing equipment; blending studies, from the point of view of both stock and color; studies of color-fastness to light, gas, liquids, and combinations of same; studies involving the chemical and physical makeup of fibers; processing studies involving new fibers, new equipment, new chemicals, and, in general, items new to the textile industry; market analyses.

In all cases, the textile colleges are attempting to meet the challenge given to them by industry—namely, the adequate training of personnel so that the industry will grow and prosper and be of greater service to mankind.—W.H.C.

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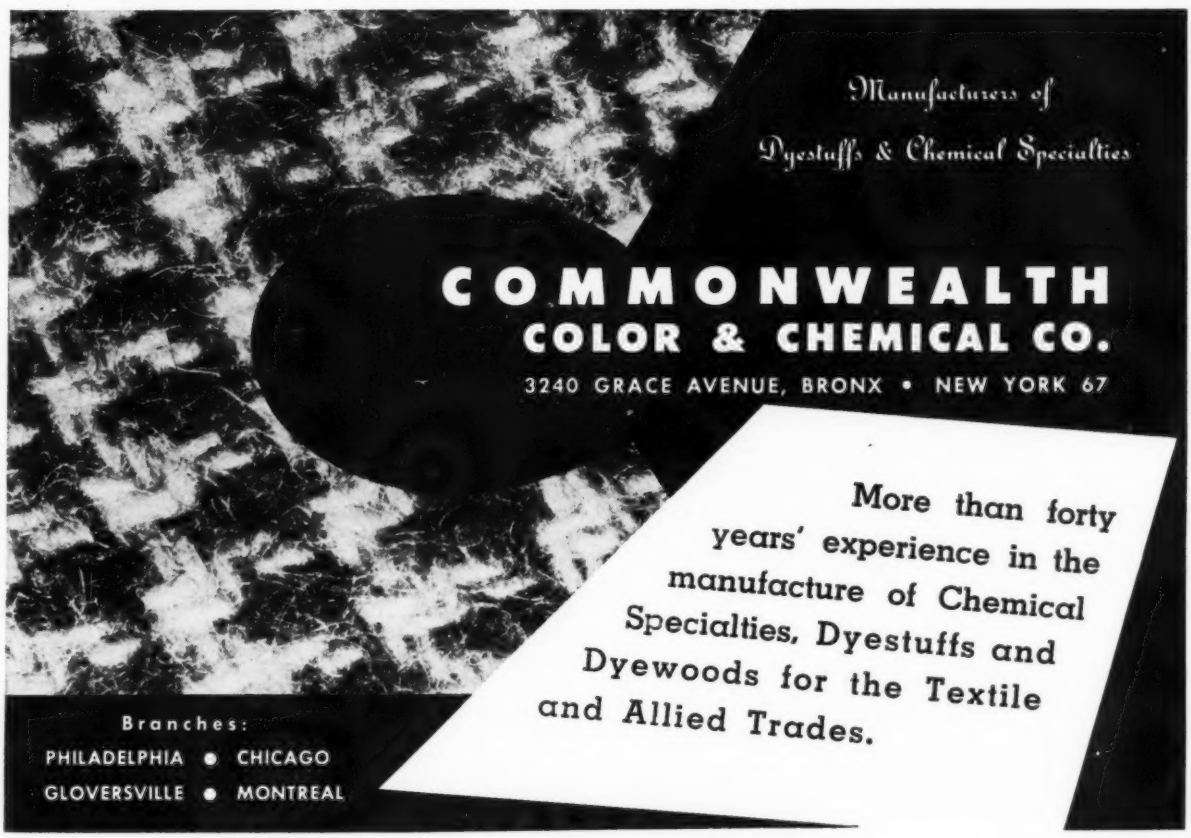
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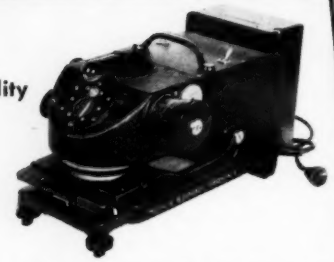

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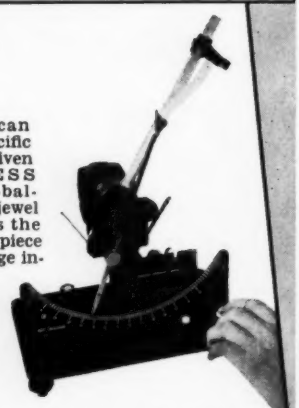

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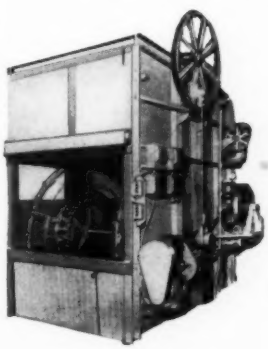

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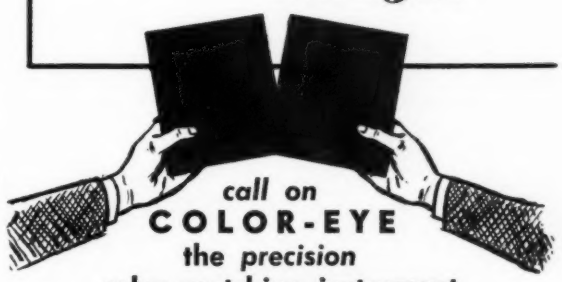

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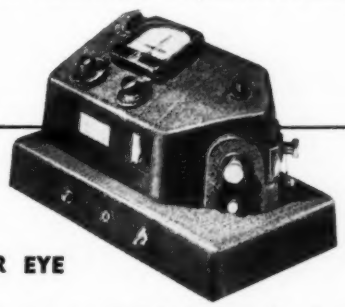

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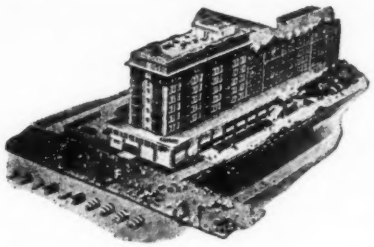

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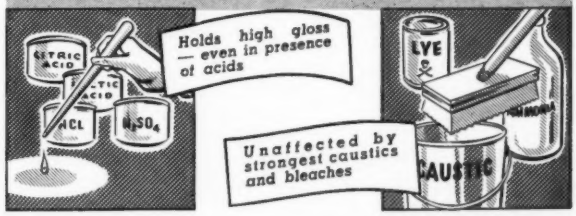

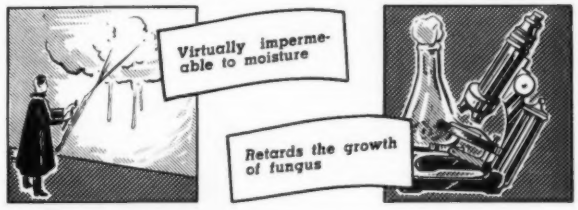

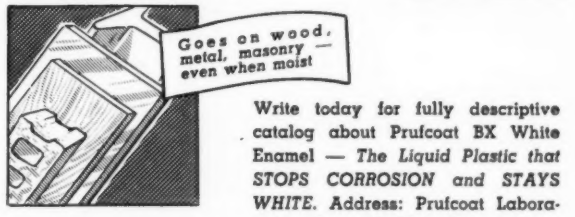

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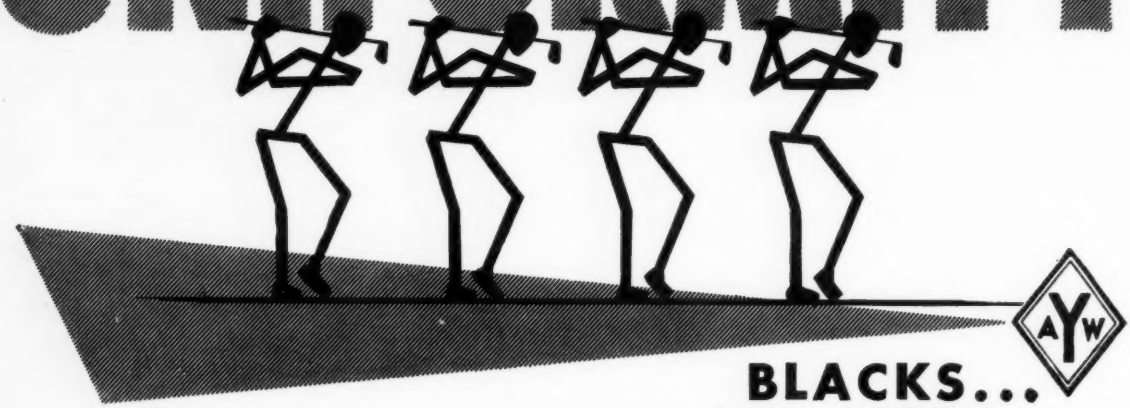

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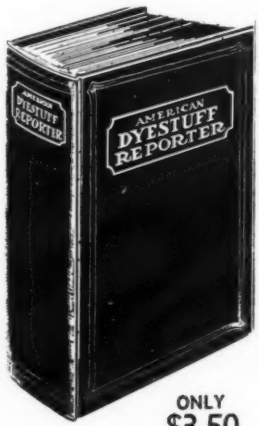

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INDEX TO ADVERTISERS

Aktivin Div., The (Heyden Chemical Corp.)	
Alco Oil & Chemical Corp.	
Althouse Chemical Co., Inc.	
Amalgamated Chemical Corp.	
American Aniline Products, Inc.	V
American Cyanamid Co. (Ind. Chem. Div.)	
American Dyewood Co.	
American Polymer Corporation	
Arkansas Company, Inc.	XLVIII
Arnold, Hoffman & Co., Inc.	XXIX
Atlantic Chemical Co., Inc.	XIII
Atlantic Refining Co.	
Atlas Electric Devices Co.	
Augusta Chemical Co.	VII
Barium Reduction Corp.	XXXVII
Bick & Co., Inc.	XXXIX
Blickman, Inc., S.	
Brighton Hotel, The	XXXVIII
Burkart-Schier Chemical Co.	L
Butterworth & Sons Co., H. W.	LII
Calco Chemical Division, American Cyanamid Co.	
Calgon, Inc.	
Campbell & Co., Inc., John	VI
Carbic Color & Chemical Co., Inc.	XXXII
Ciba Company, Inc.	III
Colgate-Palmolive-Peet Company	
Commonwealth Color & Chemical Co.	XXXVII
Crucible Steel Co. of America	
Drew & Co., Inc., E. F.	XXI
Du Pont de Nemours & Co., E. I.	
Dyestuffs Division	
Electrochemicals Department	XXII, XXIII
Emery Industries, Inc.	XLIX
Fancourt & Co., W. F.	XXIV
Gaston County Dyeing Machine Co.	XVII
Geigy Company, Inc.	Front Cover
General Chemical Div., Allied Chemical & Dye Corp.	
General Dyestuff Corp.	XV
Girdler Corp., The	
Glycerine Producers Association	
Grinnell Co., Inc.	
Gross & Co., A.	XVI
Gurley, W. & L. E.	XXXVIII
Hart Products Corp.	LI
Hercules Powder Co.	XII
Heyden Chemical Corp.	
Hilton-Davis Chemical Co., The	
Hinnekens Machine Company, Inc.	XX
Hooker Electrochemical Co.	
Houghton & Co., E. F.	
Instrument Development Laboratories, Inc.	XLI
International Nickel Co., Inc.	
International Salt Co., Inc.	

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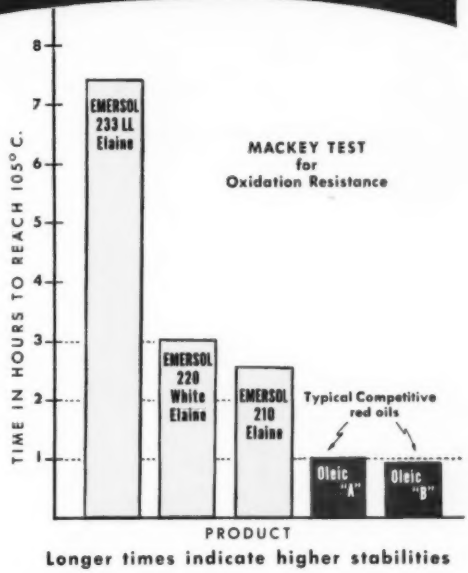

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INDEX TO ADVERTISERS

Jordan, Jr. Mfg. Co., W. H. & F.	XLII
Kali Mfg. Co.	XXXVIII
Kelco Co.	
Klauder Weldon Giles Machine Co.	XXXIX
Koppers Company, Inc.	XLII
Laurel Soap Mfg. Co., Inc.	XIV
Leatex Chemical Co.	XXXIX
Leeds & Northrup Co.	
Mathieson Chemical Corp.	
May, Inc., Otto B.	
Maywood Chemical Works	XXX
Minneapolis-Honeywell Regulator Co. (Industrial Div.)	XVIII
Monsanto Chemical Co.	XI
National Aniline Division, Allied Chemical & Dye Corp.	XXXIV
National Milling & Chemical Co.	
National Starch Products	
Naugatuck Chemical Div., U. S. Rubber Co.	
Nopco Chemical Co.	
Nova Chemical Corp.	
Nyanza Color & Chemical Co., Inc.	XXVIII
Onyx Oil & Chemical Co.	XXVI
Pabst Sales Co.	XLI
Perkins & Son, Inc., B. F.	
Pfister Chemical Works, Inc.	Second Cover
Pfizer & Co., Inc., Chas.	IV
Photovolt Corp.	
Procter & Gamble	
Prufcoat Laboratories, Inc.	XLIII
Reading Scientific Company	XLIV
Refined Products Corp.	IX
Richmond Oil Soap & Chemical Co., Inc.	XLIII
Rohm & Haas Company	XXVII
Royce Chemical Co.	Back Cover
Rumford Div., Heyden Chem. Corp.	
Sandoz Chemical Works, Inc.	XXXV
Scholler Bros., Inc.	
Socony-Vacuum Oil Co., Inc.	
Solvay Sales Div., Allied Chemical & Dye Corp.	XLV
Standard Brands, Inc.	XXXI
Standard Chemical Products, Inc.	
Standard Fabricators, Inc.	Third Cover
Stein, Hall & Co.	
Strand Hotel, The	XLIII
Swift & Company	
Tennessee Eastman Corp.	XXV
Tex-Chem Co.	XLV
Trent Tube Co.	
Turner & Co., Joseph	XLIV
Union Carbide and Carbon Corp., U. S. Vanadium Corp., Unit.	
United Chemical Products Corp.	XLVII
U. S. Vanadium Corp., Unit of Union Carbide and Carbon Corp.	
Vanderbilt Co., Inc., R. T.	XLVII
Van Vlaanderen Machine Co.	VIII
Verduin Machine Corp., John	X
Virginia Smelting Co.	
Wallerstein Co., Inc.	XIX
Winthrop-Stearns, Inc.	
Wolf & Co., Jacques	
Wyandotte Chemicals Corp.	
Yor Chemical Co.	
Young Aniline Works, Inc.	XLIV
Young Co., J. S.	
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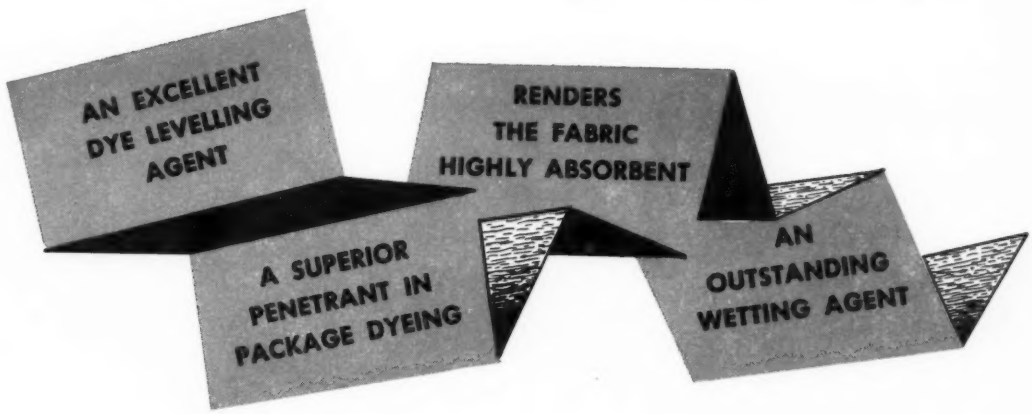
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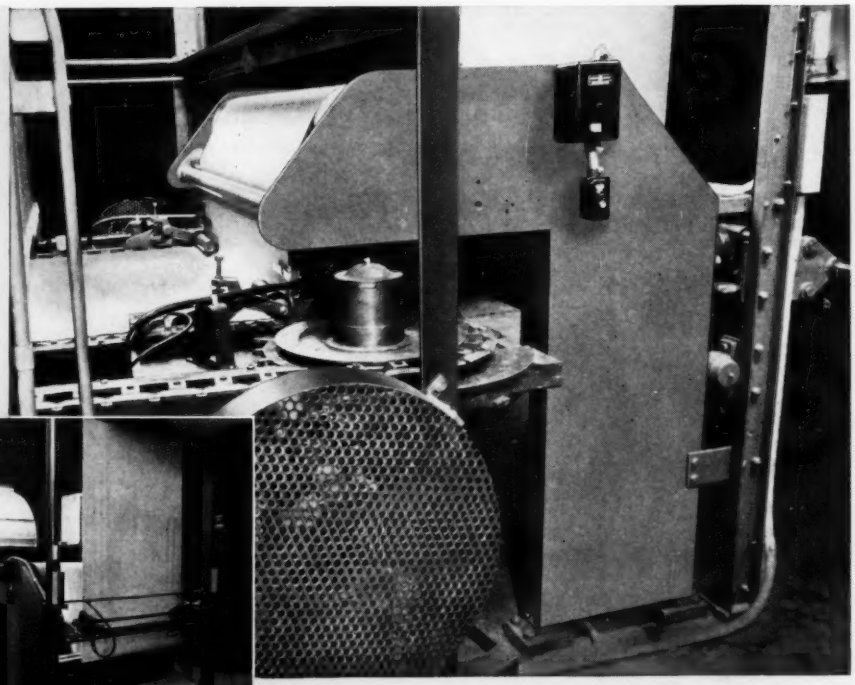
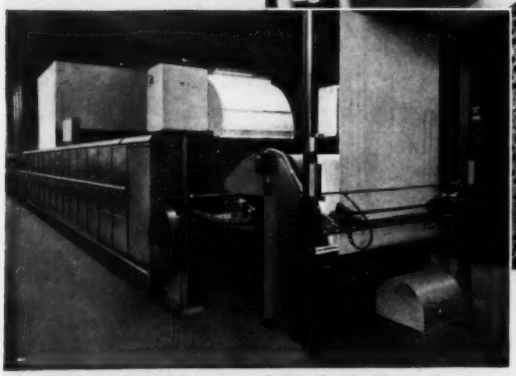
Close-up view of Ripple-Flo Overfeed Device applicable to existing straight-type tenters, either vertical or horizontal.





Entering End of Butterworth Ripple-Flo Tenter Range.

You can have RIPPLE FLO* Results

on Your Present Straight Tenter

The Butterworth RIPPLE FLO* Overfeed Device is ready to go to work on your present straight-type tenter . . . to reduce tension on fabrics during the drying process . . . to control shrinkage resulting from resin treatments . . . to improve the quality and hand of your finished goods.

By adding this remarkable new Overfeed Device, you get all the advantages of simple electric operation, accurate overfeed control and practical operating speed. And most important, it's readily adaptable to your present equipment.

Overfeed is accomplished by overdriven feed rolls ahead of the tenter brushes. A dial indicator calibrated in per cent of overfeed makes accurate setting a simple matter.

Rail guiders are actuated by a photoelectric beam on the selvage line. Electronic circuits operate instantaneously to keep tenter pin line in register with the selvage.

The Butterworth RIPPLE FLO* Overfeed Device can be used for all-purpose drying, shrinkage control, resin finishes, water repellents and permanent finishes on mixed fabrics, viscose and acetate rayon, worsteds and laces. Let us give you full details.

"MICRO-EYE" SIDE REGISTER CONTROL

Keeps selvage in proper position automatically. The signal from the scanning head is amplified and actuates a sequence of electronic circuits which, through a motor and lead screw, maintains selvage tolerance of 1/16-inch (plus or minus) in relation to the pin line.

CONTROLLED OVERFEED

Overdriven feed rolls ahead of tenter brushes are driven in conjunction with tenter drive by a patented selsyn system to give perfect coordination at all speeds. Roll overfeed is adjustable. Special brush construction picks up any selvage that comes off the pins at an irregular seam and puts it back on pin line. Facilitates piecing up when tenter is put into operation.

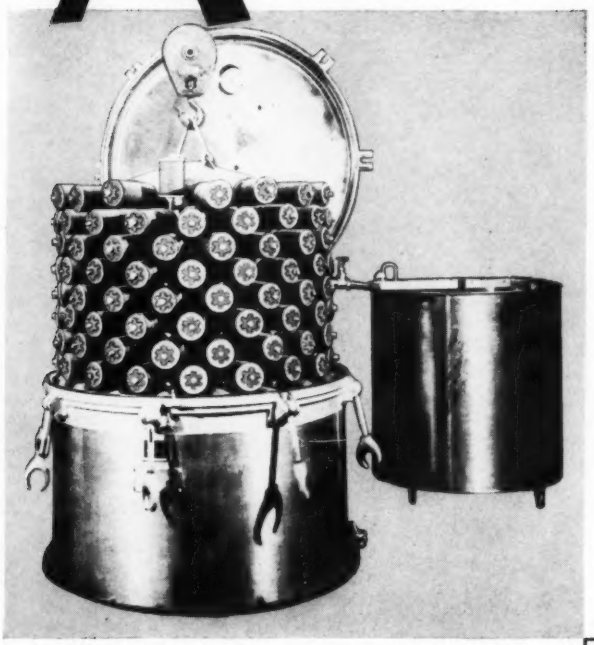
*Patent applied for; Registered trade name

H. W. BUTTERWORTH & SONS COMPANY, Philadelphia 25, Pa. 40 Fountain Street, Providence R. I.— 1211 Johnston Building, Charlotte, N. C.— In Canada: W. J. Westaway Co., Hamilton, Ontario

BUTTERWORTH

ANOTHER "STIENEN" ACHIEVEMENT

THE
Stienen
Reg. Trade Mark



RAYON AND ACETATE PACKAGE DYEING MACHINE

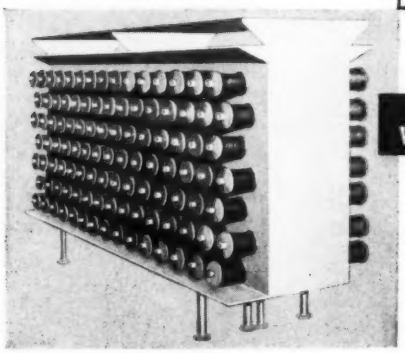
has been developed to supplement our Rayon Cake Dyeing Machine. It provides the dyer of rayon yarns with far greater flexibility.

While our Rayon Cake Dyeing Machine has its distinct advantages for certain mills, the "Stienen" Rayon Package Dyeing Machine is of utmost importance to the entire rayon processing trade.

Package dyeing of rayon is ideal wherever the source of supply is in wound form. Rayon from any size cakes, cones or tubes may be dyed in the package form. Different types of rayon and synthetic yarns may all be dyed in this machine.

The cost of rewinding to the package for dyeing is negligible in comparison to the cost of skein winding. Quality of the original yarn is maintained, as no fibre disturbance takes place in our method of rayon package dyeing.

plus A NEW CENTRIFUGAL EXTRACTOR



plus RAYON PACKAGE DRYER

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EXTREMELY HIGH CONCENTRATION . . . pound for pound, Parolite does seven times the work of liquid stripping agents.

ABSOLUTE UNIFORMITY makes Parolite easy to use in standardized procedure.

STABLE IN STORAGE . . . long periods of storage have no appreciable affect upon the strength of Parolite.

COMPLETELY SOLUBLE . . . Treated materials are left with no residue after stripping with Parolite.

Remember these two important points: Parolite is a *better* stripping agent. It is made *only* by Royce.

made only by ROYCE

ROYCE CHEMICAL CO.

*Registered Trade Mark

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